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Electrical Contracting

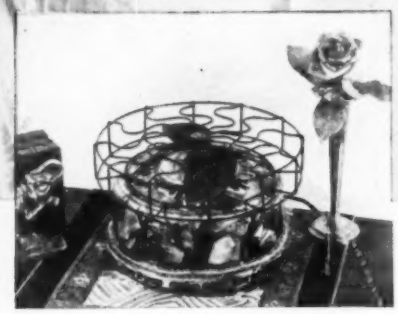
January 1933

With Which Is Incorporated
The Electragist

UMI

Bad Air...Odors...

AN UNTOUCHED GOLD MINE OF PROFITS



NOW an entirely new field—a gold mine of profits never touched before—is opened for you. Science has furnished the answer to several problems of civilized living never solved before. No longer need closed doors and windows in winter mean oppressive, lifeless air. No longer need repulsive odors of any sort be tolerated anywhere. *Ozone* . . . nature's own *vitalizing* and *purifying* gas . . . can now be generated at any 110-volt A. C. outlet.

O'zone, o'zon: *n. Chem.* A pungent gas regarded as an allotropic form of oxygen (O_3). A powerful oxidizing agent, being much more active than ordinary oxygen: employed for bleaching oils, waxes, ivory, flour and starch: also for sterilizing drinking water. — Funk & Wagnalls Dictionary.

Destroys Cooking Odors, Animal Smells, Stale Cigar Smoke—Any and All Odors in less than 15 Minutes in Average Room

So positive is the action of the Jefferson Ozonator, so spectacular its performance, that it instantly becomes the center of interest when demonstrated either in a home gathering or in the dealer's store. Even the most bitter skeptics are always amazed at the speed with which all kinds of odors are destroyed. Musty closets, rooms heavy with stale cigar smoke, the smell of fish, or boiled cabbage are all made clear and sweet *in a few minutes.* Even such penetrating odors as from medical bandages and animals are quickly overcome.

Purified and Vitalized Air Makes for Healthy Bodies and Alert Minds. Ozone destroys Germs.

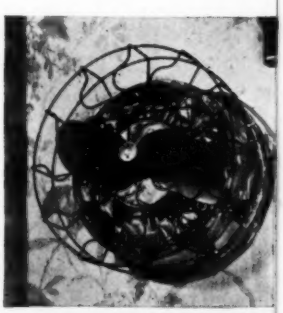
Ozone, so powerful that it is used commercially for bleaching and for sterilizing is naturally a most dependable germ killer. Thus the Jefferson Ozonator is an effective aid in fighting colds, influenza, etc., and in making either homes or public places healthy and safe. Too, because it *vitalizes* the air—giving it that exhilarating freshness of the pine woods or mountain top, it keeps minds alert and bodies active.

JEFFERSON OZONATOR

Capitalize the Interest in Air Conditioning. Reap a Harvest of Profits Now in this Untouched, Waiting Market.

Products to sell in 1933 must have *novelty* appeal. They must be *different.* They must do something *never* done before. They must be demonstrable. They must be priced right. They must have a wide market. The Jefferson Ozonator is ALL of these *many times over.* "Where can I get one of those?" is the question everyone asks when they see it operate. Be sure your store is the answer. Write or wire for complete information NOW.

JEFFERSON ELECTRIC COMPANY
Bellwood (Suburb of Chicago) Illinois



The Jefferson Ozonator is of dignified and attractive design. It is arranged with key hole slot in back for hanging on wall and with rubber feet for standing on table or cabinet. The ozone tube generator and all electrical equipment are fully enclosed. The fa creates air movement to insure complete and even ozonation of any room. Operates on 110-volt *alternating current* and uses less current than a 25-watt lamp. Arranged with switch to adjust ozone discharge to conditions.

UMI

VOLUME 32
NUMBER 3

electrical contracting

WITH WHICH IS INCORPORATED THE ELECTRAGIST
S. B. WILLIAMS, EDITOR AND GENERAL MANAGER

PUBLISHED MONTHLY

BY

ELECTRICAL TRADE
PUBLISHING
COMPANY

HOWARD EHRLICH, PRESIDENT
EDGAR KOBAK, SEC.-TREASURER

CHICAGO
520 NORTH MICHIGAN AVE.
WHITEHALL 7900

NEW YORK
330 WEST 42ND ST.
MED. 3-0700

CLEVELAND
GUARDIAN BLDG.
MAIN 3981

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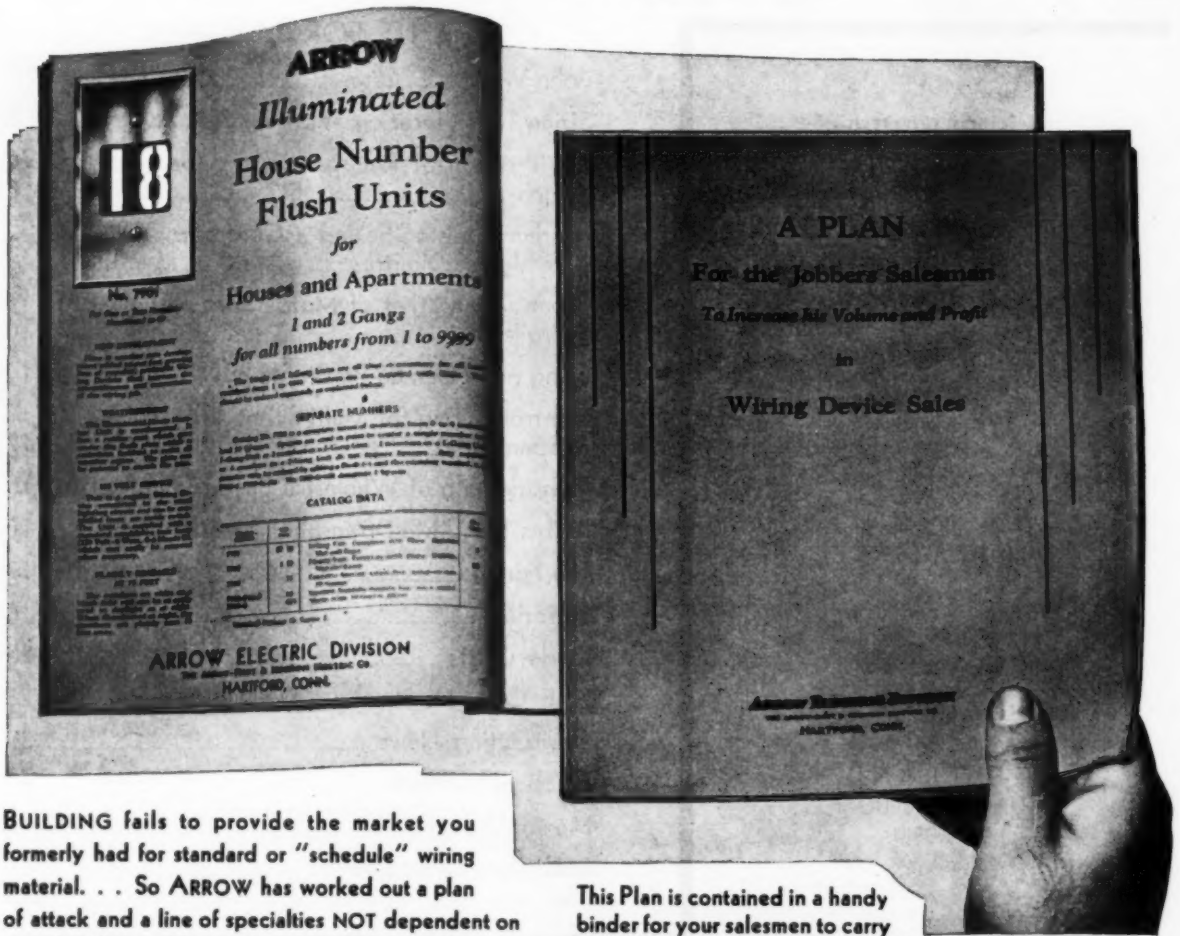
Send for this PLAN *to make sales to the new* MARKET *Arrow is developing* TO-DAY



BUILDING fails to provide the market you formerly had for standard or "schedule" wiring material. . . So ARROW has worked out a plan of attack and a line of specialties NOT dependent on new building. Our engineering and manufacturing heads have built for you a consumer-appeal line, co-ordinated in a Plan for interesting your REAL prospects for wiring jobs today.

This Plan is contained in a handy binder for your salesmen to carry and SELL from. Includes illustrated pages of ONLY those items for which there's a proven demand TODAY. All are non-competitive specialties; priced to allow a real profit. Send for your copies — one for each salesman to canvass with — or *Ask your Jobber's salesman to show you this Plan.*

ARROW ELECTRIC DIVISION

THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

1932—1933

WE have closed another year. Are we happy or sad? A year ago we closed our books on 1931 with a sigh of relief and looked to 1932 to bring sunshine back into business. How many of us in closing our books for 1932 wished that business had just been as good as it was in 1931?

VOLUME for 1932 was considerably below that for 1931 but how about losses? How many contractors learned to live within their income in 1932, who in 1931 with more business went into red ink?

Last year was undoubtedly a year of despair and ruin to many but to the electrical contracting business generally it was a year of great progress.

Not only did contractors learn to keep out of the red on a lessened volume of business, but they learned the more important thing—how to sell. This in itself was worth all of the depression because of the effect it will have on future business.

When new building work was good contractors did not have to sell. Their business came in "over the transom". Somebody else created a job that they were asked to figure.

Today there is virtually no new construction yet there remain some 14,000 active electrical contractors. Where is their business coming from if they themselves are not creating it?

Up until fairly recently the utility, manufacturer and wholesaler was seldom concerned, beyond the point of talk, with helping the contractor develop business. They were ready to criticize him for not selling more, but they never dreamed that they had any responsibility for helping him develop a market. Well, 1932 helped to change that attitude too.

The business of the contractor has a new meaning today to these others. As a point of public contact the contractor is important. He can do things much more efficiently than the direct-selling salesman of the manufacturer. He can relieve the utility and the wholesaler of some sales expenses.

The year brought a return of many people to the fundamentals of distribution where bypassing is minimized. This, in itself, is bound to have an important bearing upon the trend of the electrical business.

And finally, the year brought many new products —new markets for the contractor. His opportunity is, therefore, bigger today than it was a year ago.

WOULD it not appear then that the year 1932 was a year of preparation? Would it not look as though 1933, so far as the electrical construction business is concerned, might be a year of progress?

It has been the contention of ELECTRICAL CONTRACTING that the contractor was the keystone of the electrical arch. In good times nobody paid much attention to him but now, in times of depressed business, the rest of the industry must look to him for the way out.

There will be some misguided manufacturers who will still expect him to do all their selling. They will not be successful.

The utility, or manufacturer, or wholesaler, on the other hand, who is smart enough to look upon the contractor as he would one of his own salesmen and give him the same help and encouragement will find 1933 a more profitable year.

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GraybaR

7 YEARS OLD

64 YEARS IN BUSINESS

In 1869, Gray and Barton; in 1882, Western Electric Supply Department; since January 1, 1926, GRAYBAR

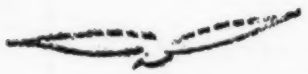
VOLUME 32
NUMBER 3

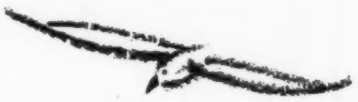
electrical contracting

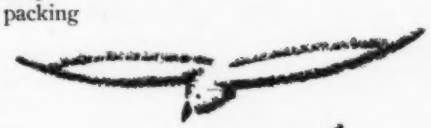
WITH WHICH IS INCORPORATED THE ELECTRAGIST

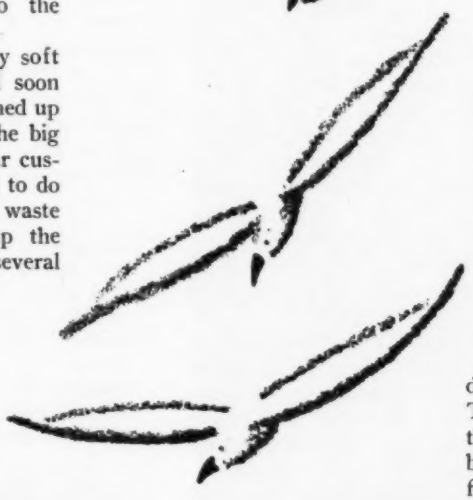
JANUARY
1933

the lesson of the sea gulls









IT seems there was a fish cannery on the West Coast, and, believe it or not, it was the only one in the immediate locality.

Now, fish are different from pigs, where even the squeal goes onto a phonograph record to advertise the packing business. In other words, there are parts of fish which are useless and this cannery just slid them into the Pacific.

This made it plenty soft for the seagulls, and soon after the cannery opened up it had hundreds of the big white flyers as regular customers. All they had to do was hang around the waste chute and gobble up the refuse. But, after several years, along came the famous "economic adjustment" and the cannery moved away bag and baggage. This meant no more soft pickings for the gulls and the result was terrible. For said gulls had all grown so fat and lazy they looked like overstuffed geese with their bills filed sharp.

But the worst part was that they had actually forgotten how to catch fish. One observer said they would make as high as fifty misses, where before the cannery came any fool gull would have a batting average of at least one kill in five passes. Naturally a lot of them starved to death, but hunger worked wonders and, after a few desperate weeks those who survived were all down to fighting weight again and their old cunning returned.

Now it looks to me as if our industry is just convalescing from the same disease. During and after the World War, when everybody had dough to spend, we had so much work handed to us on silver platters, we just forgot how to sell.

When the depression came and kept getting worse, we were sort of stunned and disorganized and a bunch of us went to the wall. The rest found out it was "root hog or die" and those who haven't waked up and carried the battle to the customer's door aren't getting to first base. But the boys who are going after every available prospect with a proposition are getting the bulk of the wiring business.

We are learning all over again the art of snatching fish off the waves at 60 miles an hour, and Old Man Necessity is making salesmen out of contractors who never dreamed they could sew up a prospect as well as any bond salesman.

Don't wait for another cannery to move in!

UMI

Sizing Up Alteration Work

By RAY ASHLEY
Formerly Chief Estimater, Electrical Survey Bureau, Chicago

ELECTRICAL contracting for alteration work has always been hazardous, and with the steady increase in the number of pipes and ducts in the floors and ceilings, the risk becomes even greater. The nature of this risk varies with the size and type of the job. A list or table of all the known types of jobs and combinations of construction would be too long and cumbrous to be of any practical use. From the standpoint of known working conditions, however, four important classifications can be made:

(1) Minor alterations in unoccupied spaces.
(2) Minor alterations in occupied spaces.
(3) Major alterations in unoccupied spaces.
(4) Major alterations in occupied spaces.

Work coming under these four classifications shows a great variation in the percentage of labor used for operations which are not applied directly to the installation, such as handling tools, receiving material, traveling time, and other items incidental to the actual installation of the material. Labor required for such operations will run as high as 25 per cent of the total labor cost on a small job and may run as low as 2 per cent on a large job.

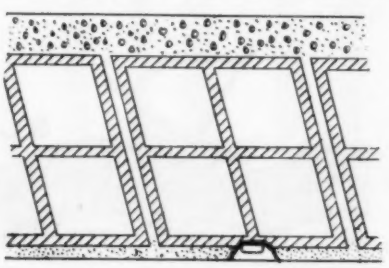
In the case of minor alterations in occupied spaces, there is the added cost of covering and moving furniture; plaster channeling and cutting has to be done by hand to avoid excessive dust and noise and there is always a possibility that the work benches and materials may have to be placed at some point quite removed from where the installation is being made. The time spent in keeping the place clean and keeping tools picked up runs much higher than it does for unoccupied spaces.

It is apparent, therefore, that large installations in unoccupied spaces present by far the best conditions. In addition to being free from the difficulties enumerated above, there are many opportunities for saving on the estimated labor cost. Conduits may be run in trenches cut for other pipes or in new partitions. After the contractor is on the job, he may find that it is possible to group many of his conduit runs in the same trench, thus keeping floor cutting down to a minimum.

Major alterations in large spaces are seldom attempted without first having the space vacated. If, however, the work is to be performed during the occupancy of the space, the contractor will find that in most cases the cost of moving furniture and keeping tools out of the way does not run as high, in proportion to the job, as it does for a smaller change. Working conditions are less cramped and a larger space can be cleared at one time.

Due to the great variation in jobs and job conditions, a contractor must keep his own data and study his own work to know just what allowances should be made for variation in costs.

Where the channel in the plaster is not deep enough to properly install the wiring, the surface of the tile should be chipped off (left) without breaking through the tile. Do not break through tile as at right. It weakens the building structure by breaking down the arch and makes a rough and insecure installation.



CHECK LIST for Alteration Work

Some of the most important items which affect labor costs in alterations.

Every item should be checked both while preparing the estimate and when visiting the job.

1. Amount of cutting required.
   a. Ceilings and walls
   b. Floors
2. Construction of floors and ceilings.
3. Possibility of cutting with machines.
4. Depth of plaster.
5. What portion of work will be in new construction.
6. The location of the work benches with reference to the work to be done.
7. Ceiling heights.
8. Space available for storage of material.
9. Is work scattered or condensed?
10. Possibility of having work held up due to slow progress of the entire job.
11. Possibility of interference from pipes and ducts in floors and ceilings.
12. Cost of maintaining existing electrical work.
13. Work involved in moving existing equipment.
14. Portion of existing installation available for use.

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LABOR RECORD SHOWING VARIATION IN COST BETWEEN A SMALL AND LARGER JOB IN AN OCCUPIED SPACE (BOTH JOBS WERE IN THE SAME BUILDING)

ITEM OF WORK	JOB NO. I 10 Outlets			JOB NO. II 112 Outlets		
	Quantity	Time Hrs.	Min.	Quantity	Time Hrs.	Min.
Rec. material and tools at curb and taking to frt. elevator			30		1	05
Waiting for elevator			15			30
Moving material from elevator to place of work and setting up bchs.			25			50
Covering furniture			30			..
Laying out & channeling plaster	110 ft.	12	20	1232 ft.	66	..
Installing ovalduct	132 ft.	9	20	1344 ft.	89	20
Installing outlet boxes	10	3	35	112	34	45
Pulling wire	340	2	40	2360	18	50
Putting benches & material away at noon & night			45			..
Moving furniture			30			..
Removing tools & material and cleaning up			50		1	25
Travel time		1			2	..
Totals		32	40		214	45

Note that in the case of the smaller job approximately 14% of the time was spent in handling material and doing other work that did not directly apply to making the installation, whereas only approximately 2½% of the time was used in this way on the larger job.

Data, kept on installations of approximately 10 outlets for small jobs and 100 to 150 outlets for large jobs, showed a marked increase in the labor costs for the smaller installations.

Using the larger jobs in unoccupied spaces as a basis, the other three classifications showed the following increase in labor costs:

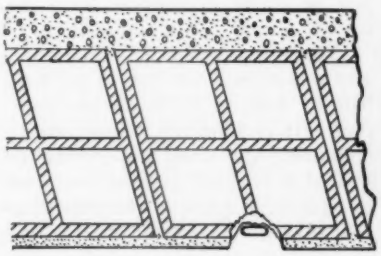
Minor alterations in occupied spaces 28 to 35 per cent more.

Minor alterations in unoccupied spaces 22 to 30 per cent more.

Major alterations in occupied spaces 8 to 15 per cent more.

This data was taken from work in more or less typical buildings, namely, in buildings where it was necessary to depend on elevator service and where the construction was of wood floors on cinder fill and ceilings of plaster on tile. Where the construction is wood joist or suspended ceiling, the difference is decreased by about 5 per cent due to the fact that there is little cutting.

Determining what classification a job comes under from the standpoint of working conditions does not usually involve any great amount of study. Determining what the method of installation will be, may involve considerable time and careful study.

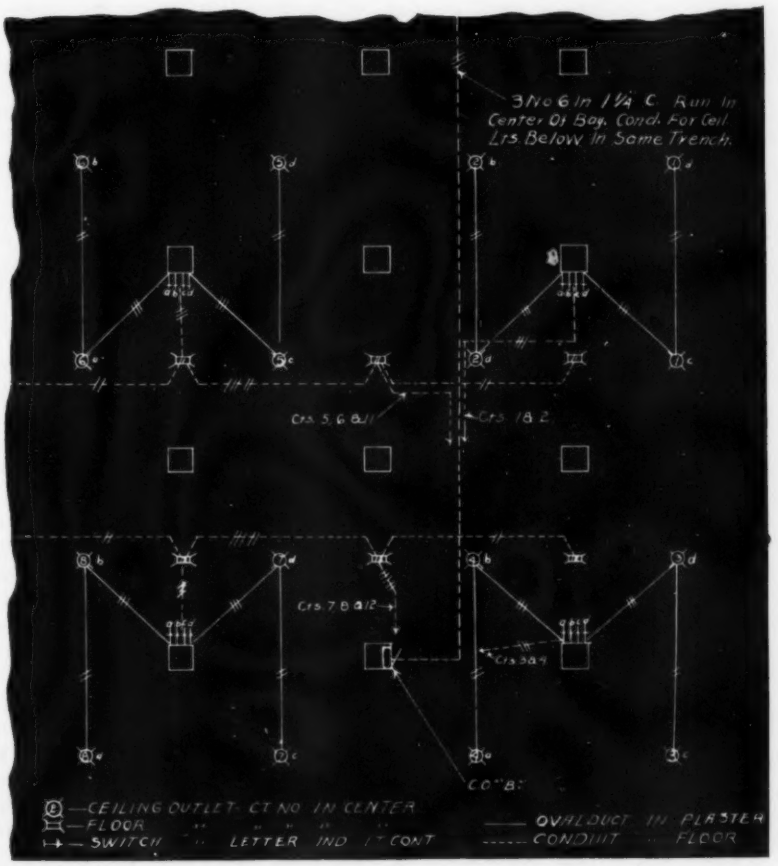


Buildings of wood joist construction are more or less standardized, but fireproof and semi-fireproof buildings present many combinations of floor, wall and ceiling construction. Of the following common forms of construction, most any combination may be found:

FLOORS
- Wood sleepers in cinder fill (cinder concrete).
- Wood sleepers in concrete fill (stone concrete).
- Concrete on cinders (ground floor).
- Concrete on tile.
- Concrete on concrete joist.
- Flat slab concrete.
- Composition on concrete.

WALLS
- Tile.
- Brick.
- Composition.
- Wood studding (balance of building fire-proof).

CEILINGS
- Plaster on concrete.
- Plaster on tile arch.
- Plaster on tile with concrete joist.
- Plaster and wire lath tight up against concrete joist.
- Plaster and wire lath on channel fastened to concrete joist.
- Suspended ceiling.


3 No 6 In 1¼ C Run In Center Of Bay. Cond. For Ceil. Lts Below In Same Trench.
Crs 5.6 a/11
Crs 18.2
Crs 7.8 a/12
Crs 30.9
CO "B"
—CEILING OUTLET CT NO IN CENTER
—FLOOR " " " "
—SWITCH " LETTER IND 1" CONT
—— OVALDUCT IN PLASTER
------ CONDUIT " FLOOR

Floor cutting can be reduced to a minimum by carefully laying out conduit.

UMI

With so many combinations possible, one cannot be too careful in getting his information. To know that the building is of fireproof construction is not sufficient. The cost of channeling stone concrete may run 100 per cent higher than the cost of channeling cinder concrete. If the building is semi-fireproof construction with wood partitions, the cost of vertical channeling can be partly eliminated.

In the case of the ceilings there may be a difference of as much as 100 per cent in the cost of installing outlets in different types of structures. If the ceiling is suspended, the work can be fished in or installed in conduit and the cost of cutting becomes a small item. If the wire lath is furred down from the joists and beams with channel, again it may be possible to fish a great deal of the branch wiring at a cost slightly greater than that for a wood joist job.

In cases where it is necessary to channel the plaster, the cost of channeling runs fairly uniform if the plaster is thick enough so that it will not be necessary to cut into the subsurface to get deep enough channel for properly installing the work. If the plaster is less than ¾ in. thick, the cost begins to vary, depending on the amount of cutting in the subsurface. This increase in cost may run as high as 25 per cent for channeling by hand but it can be kept down by using a high speed grinding wheel. Such a machine is not only faster, but it enables the workman to better regulate the depth of cut. Its use is limited, however, due to the great amount of dust and noise.

Thin plaster on tile presents one of the worst conditions, due to the danger of breaking through the tile. Some mechanics do not hesitate to break through the surface and ribs of the tile structure. This is poor workmanship, and owners' representatives who are familiar with building construction will not permit such practice.

While the cursory examination that the contractor is able to make, before estimating a job, seldom reveals all the peculiarities of the building, one should visit the building site before completing the estimate. It may sometimes be necessary to visit the site more than once to get all of the details.

There are certain items affecting labor costs which have to be considered in connection with almost every alteration. One should keep a list of these items before him both while figuring the labor and when visiting the job. Some of the most important will be found on the first page of this article.

The electrical layout seldom shows all the work involved, and one should not attempt to figure the cost without a complete set of architectural plans and specifications.

Plans are often sent out for figures which have the outlets, only, shown and the estimator must make his own layout. Many good contracts are obtained by electrical contractors as a result of the estimator's ability to make an economical layout.

The most economical layout is not necessarily the one that involves the least amount of material. By using more material, it is often possible to carry several conduits in the same trench; thus effecting a great saving on the amount of cutting required. The saving in labor cost may be much greater than the additional cost of material.

The success of a contractor handling alteration work depends a great deal on his ability to see when he can save on labor, even though it is sometimes at the expense of material.

The Problem of Reinspection

By GEORGE WELMAN

Electrical Engineer, Louisiana Rating Fire Prevention Bureau

WITH the growing cooperation between the various branches of the electrical industry the problem of re-inspection begins to assume some definite shape.

It is prohibitive to attempt to make a technical inspection of every electrical installation in any large city by trained experts in the electrical inspection department. The best that any inspection department can do is to make a somewhat superficial inspection and even a system of superficial inspection of every building by an electrical inspector in a city like New York, Chicago, or St. Louis is not seriously contemplated.

The electrical inspector, however, when he is engaged in inspecting alterations and repairs in any building makes a somewhat superficial inspection of the entire equipment and in his report makes it plain that the inspection is merely to ascertain the most flagrant hazards. He may also, when time is available, and he has the information concerning any particularly dangerous installation, make an inspection and report the dangerous hazards. The report should of course be somewhat of a guide to the contractor, but it should be made plain to the user and the contractor that a careful examination of the entire equipment should be made by the contractor in order to complete the inspection and make the necessary repairs.

It is not really necessary for the job to be undertaken by only the staff of electrical inspectors. The firemen should be trained and brought into the picture so that when they make a fire hazard inspection they will take notice of electrical defects that are dangerous, especially the flexible cord hazard. Flexible cords have a relatively short life and should be renewed when they show signs of insulation deterioration. Fuses may also be examined by firemen, and if found bridged or too heavy, indicate that trouble has developed in some part of the equipment.

Whenever an electrical contractor has been called in to correct the defects reported by the firemen he should make a detailed inspection of the entire installation. The contractor's report should be handed to the electrical inspection department in the event that the user is reluctant about making repairs. A little persuasion on the part of the contractor may be sufficient to convince the user that the inspection department should not be called in, except as a last resort.

Where there is a will there is a way was never truer than in the problem of making electrical re-inspections. It is simply a matter of systematizing the work and getting the mutual help of all persons concerned in safe and efficient electrical construction.

UMI

Fundamentals of Selling a Contractor's Service

by
JAMES DIMITRE
DIMITRE
ELECTRIC CO.
PORTLAND
OREGON

James Dimitre

SOME electrical contracting businesses are conducted on a basis of too much front, and overhead is boosted out of proportion. Closely allied to this is the fact that some still consider it essential to entertain, or to extend favors of one sort or another, which may amount almost to "buying" the job.

It is my opinion that a contractor who attempts to bluff his way to securing business, by posing as a much larger organization than he really is, or who "buys" his jobs, is not doing the kind of selling that is good for our industry. Whether or not he, as an individual, can survive by so doing is not my concern. But these methods, followed by a few in a community, and which are not real salesmanship, put a burden on all.

Most of you who read this will understand what I mean when I say that very early in the negotiations you can spot the job that will have to be "bought" in some indirect manner. It has always been my policy to stay away from this kind. I do not boast of any high-minded attitude in so doing. As a salesman of electrical contracting service, I find that it requires all my resourcefulness to sell a job on the basis of Cost, plus Overhead, plus Profit. When it comes to selling it at Cost, plus Overhead, plus Profit, plus Sugar, that is another and more difficult problem.

To be successful from a sales standpoint, which, after all is a prime essential of the business, the contractor must go beyond the point of being able to do a good workmanlike job of wiring, and being able to explain it intelligently to the prospect. He must know something about, and have friends in, the key industries or lines of business in his community. He should have contacts—friends—among the bankers and financial institutions, among the larger realtors, department store executives, utility executives, etc. He should be able to converse with them intelligently about their business as well as his own. It is through these contacts, consistently and vigorously cultivated, that he gets the sense of what is going on in his community, and is often able to get advance information on building projects, which is so essential to an intelligent sales plan on his part directed toward getting the contract. How many of us can remember getting specifications on a job we had never heard of, and being asked to submit a bid within 24 or 48 hours. Too late then to do any selling and strengthening of our position; submit the bid and pray that there were no errors was about all that could be done.

So, I should say that the contractor, to do a thorough job of selling, must put in a certain amount of his time just g e t t i n g among people of the type who are in a position to know what is going on in the community in their lines. After all, this is what the salesman of any commodity or service of widespread application, such as ours, must do and is paid for doing.

"You robbed me on that wiring job. You charged me $250 and I find I could have got it done for $222." How many have had something like this thrown at them? In certain classes of highly competitive work, as for instance, house wiring, I deem it good salesmanship to anticipate such a contingency at the very start. I may be asked to figure on a job of this kind. I will not take it unless I can make a profit. And on the other hand I realize that there are others, with a different set-up from mine, who would probably submit a figure considerably lower for just as satisfactory a job. I have no hesitancy in such cases in frankly telling the customer of this situation. Sometimes, this very frankness appeals to him, and I get the job anyway. Otherwise, if he goes elsewhere, he still may remember me favorably for it at some future time, on a job of greater importance. At any rate, I do not run the risk of having one of these unfair accusations thrown at me.

Therefore, good salesmanship in electrical contracting seems to me to revolve around these factors: (1) "Be yourself," without false front. (2) Get the job on the basis of the service you can render, and do not try to buy it. (3) Get around among the people of your community and improve these contacts. (4) Be frank in your dealings as to this matter of price, and charge what your work is worth, and not what you think the other fellow may bid.

UMI

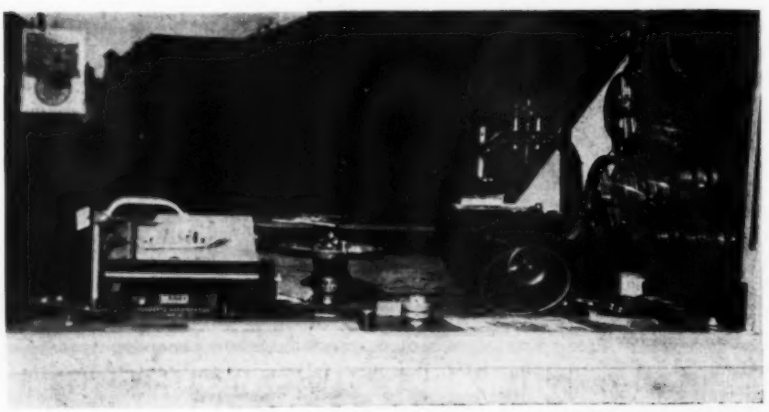
F. T. Broiles.

Main floor of International Electric & Machinery Co. establishment showing new and re-built motors and paper pulley stock in wall bins.

Expanding Market of Motor Specialist

Motors alone, including the sale of new machines, re-building and re-winding, no longer present a sufficient field in which to build a healthy, growing business in the opinion of F. T. Broiles, manager of the International Electric & Machinery Co., of Los Angeles. This is one of the largest motor repair establishments in the city and Mr. Broiles' experience extends over a period of many years.

He believes that other ways of producing income must be resorted to in order to keep an establishment of this sort in operation on a profitable basis through good years and lean. What he is doing, aside from straight motor repair work, may give workable ideas to others in this line. They are set down in the next column.



Show window devoted to small wood-working machinery.

BROILES' II ADDITIONAL BUSINESS BUILDERS

(1) Handles V-belt drive.

(2) Handles a line of small wood-working machinery — for home and small shop consumption, but not the heavy machinery for large wood-working plants.

(3) Sells ventilating equipment—blowers and exhausters.

(4) Carries flexible couplings.

(5) Carries complete line of paper pulleys.

(6) Has for resale a complete line of magnet wire and moves a considerable amount in a year's time.

(7) Carries a line of small tools, chucks, drills and attachments.

(8) Agents for belting, both leather and rubber.

(9) Deals in second-hand pumps and does quite a business with pump dealers.

(10) Re-builds small a.c. generators up to 100 k.v.a. sold largely to mining companies. Got this business through acquaintance with mining supply houses. It is a specialty on which he does business up to a distance of six or eight hundred miles from Los Angeles.

(11) Makes and sells a line of dental lathes. Buys a standard 1/4 h.p. ball-bearing, 3600 r.p.m. motor and connects with a dental lathe. Finds this very profitable and handles exclusively through dental supply houses. Gives them 25%.

UMI

W. A. Hopper
Gem State Electric Co.
Boise, Idaho, tells how

Being High Can Be Profitable

ONE day some years ago when I could sharpen pencils and figure as close as the next one, and when I did not seem to be making any real progress in this business, I suddenly thought to myself: "if I am going to continue in this business I am going to make something out of it. If I can't, then I will quit." To steel myself in this determination, the next job that came up where bids were asked I off-handedly remarked: "When the bids are in, take the highest one, add 10 per cent to it and call that my bid."

I am not saying here how I came out in that case. But I do know that the stand I took not only stiffened my own backbone, but it created some little astonishment, and as time went on and I pursued somewhat the same tactics, I did not seem to lose business but rather to gain by it. A few instances may be cited to illustrate the attitude I try to take in the matter of selling the job.

A lady was in the market for some new fixtures and re-wiring. Looking the place over, I told her that it would cost her no more than $50. She asked me if this was the lowest figure that I could give, and I promptly told her, no, that it was the highest figure I could give. Furthermore that I knew she could get plenty of lower figures, but that I made it a practice to give the highest figure that might be necessary to cover the quality of merchandise, grade of work and satisfaction with the result that I would guarantee her. This line of talk seemed to make an impression, and without getting a figure elsewhere she gave me the order. Later, when the work was done, and after taking a fair profit I was able to send her a bill of $36, she was overcome with amazement not to say delight. If I had figured to the bone in the first place and quoted $30 or $35, she probably would not have thought as much of me and might even have gone to several others for prices.

In the case of a certain industrial plant job where bids had been asked, the manager called me to his office after the bids were in and asked me why I was invariably the high man on everything. I told him that he had already stated the reason—so that business could be good. That I could not do a good job for him and neither could anybody else, year in and year out, if my business was not good. Anyway, I got the job, at a figure of $850, though I learned later that the lowest bid in was $600.

Now I can hear someone say: "I'll bet this guy is the biggest price-cutter of all. Just to say that he is going to bid high and acquire the reputation of being high man is not going to get the business. There is a whole lot more to selling service than that."

With the last statement, I thoroughly agree. Along with high prices not only goes the necessity for putting in the best of materials that can be obtained and employing the best wiremen available, but also the necessity for having the nerve to cut yourself out of some revenue, if this will be to the best interests of the customer. This statement may again be illustrated by actual examples.

In our territory is a school where there are a considerable number of motors in operation. These were continually giving trouble in one way or another and we were the contractor called in to service them. For a long time I had been seeking to have the authorities let us go in during the summer, when school was not in session, and check and overhaul all the motors in the building at one time and put them in such condition that they would operate during the next school year. We sold them on the idea that it would save them a great deal of money in the long run. And so it did. We now get about $70 or $80 a year out of this school where before we got $700 or $800.

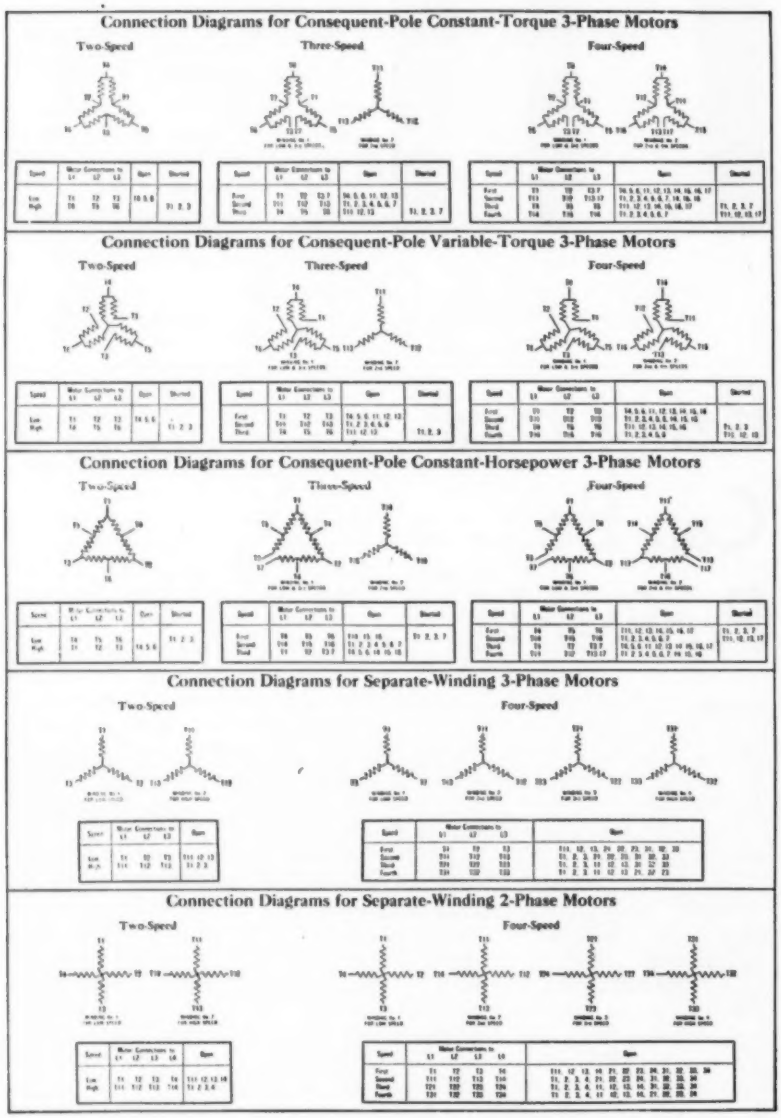
Just one final example, before I sum up what seems to me to be the prime principle in selling. A rancher 60 miles out in the country had a motor go down and he was without water. We had no new motor in stock, but took a rebuilt motor and drove the 60 miles with it and made a temporary installation. Then as soon as a new motor could be obtained, we made another trip and installed it, not charging the rancher a dime for the total of 240 miles that we traveled. To say that he was more or less dumb-founded is putting it mildly. He had expected a pretty stiff service charge. The fact that we were able to put up the right story to the manufacturer later, to cause him to reimburse us for the cost is beside the point. Some would have socked the service charge onto the rancher. We took considerable more time and trouble to sock it to the one whom we felt should bear it.

So, the principle in selling which I believe to be sound is this: Have the nerve to charge prices right down the line which will give an adequate compensation for the highest class of service that can be rendered, and which will put your business on a basis that will enable you to go to the other extreme in giving customers the breaks that should be legitimately coming to them. In that way you will get the reputation of being "high," but if this is backed up with the reputation of always making good, it will be a reputation that you can cherish and build upon.

UMI

Control Wiring for Multi-Speed Motors

By F. L. SPANGLER
Industrial Engineer, Allen-Bradley Co.



Connection diagrams for multi-speed motors.

THE multi-speed squirrel-cage induction motor is increasing in popularity in alternating-current services because of economic and mechanical considerations, and is now being used in almost all industries. This motor can best be described as a squirrel-cage motor with several stator windings. By interconnecting these windings through suitable switches, drums, or contactors, a combination of two or more squirrel-cage motors can be obtained, each having a different synchronous speed.

To change the speed of a squirrel-cage motor, it is necessary only to change the number of poles. This is usually done, in the multi-speed motor, in one of two ways:

(1) By reconnecting sections of the same winding, thereby resulting in a regrouping of the poles.

(2) By providing a separate winding to give the desired number of poles.

Where the separate speeds are obtained by means of separate windings, the motor is known as a separate-winding motor. Where the same winding is used to provide more than one speed, the motor is said to be of the consequent-pole type. Where speeds are mentioned, they refer to synchronous speeds, which will be somewhat higher than full load speed, depending on the amount of slip.

Because of the simple connections in the case of the standard squirrel-cage motor, the electrician is apt to wonder why so many more leads must be used in the case of the multi-speed motor which, as already explained, is also of the squirrel-cage type. It is found, for example, that the leads between the control panel and the motor vary from six in the case of a 2-speed, 3-phase motor to sixteen in the case of a 4-speed, separate winding, 2-phase motor, and nine or ten control circuits are required between the control panel and the push-button station for 4-speed control. It is not difficult to understand the control circuits of multi-speed controllers and multi-speed motors if one realizes that each winding must have its separate and distinct control switch; and where one winding is used for two speeds, two such switches must be used, one switch giving one speed while the other switch reconnects the winding in such a manner as to give the second speed.

Another method of multi-speed

motor control employs a drum switch instead of magnetic switches of the clapper type. The drum switch may be either non-reversing or reversing. The movement of the control handle to any position selects the corresponding speed by connecting the proper winding to the supply line in such a manner as to give the pole grouping corresponding to that speed. For example, if the handle is moved to the third forward speed in the case of a motor having speeds of 1200, 900, 600, and 450 r.p.m., the connections made by the drum contacts result in a grouping giving eight poles or a speed of 900 r.p.m. A movement of the handle to the fourth speed in the reverse position results in a reversal of one of the phases and a grouping giving six poles. Since these drums are not designed to make and break the motor circuit directly at the drum contacts, they must be used in connection with an automatic line contactor which operates each time the motor is started and stopped and whenever the control handle is moved from one speed to another.

Overload Protection

Full overload protection for multi-speed motors can be assured only by providing a set of overload relays for each one of the motor speeds. This is obvious when one considers that the maximum current carrying capacity for any given speed may be quite different from that for any of the other speeds. In the case of automatic controllers having magnetic switches operated by push buttons, a set of thermal relays is usually provided for each speed. These relays are on the controller panel, there being one relay in each of two phases whether for 2- or 3-phase motors.

Where the drum type of controller is used, proper protection requires the installation of relays in the leads between the drum controller and the motor, the number of relays required being double the number of speeds for which the motor is designed. For any one speed, one set of relays will suffice for either forward or reverse operation.

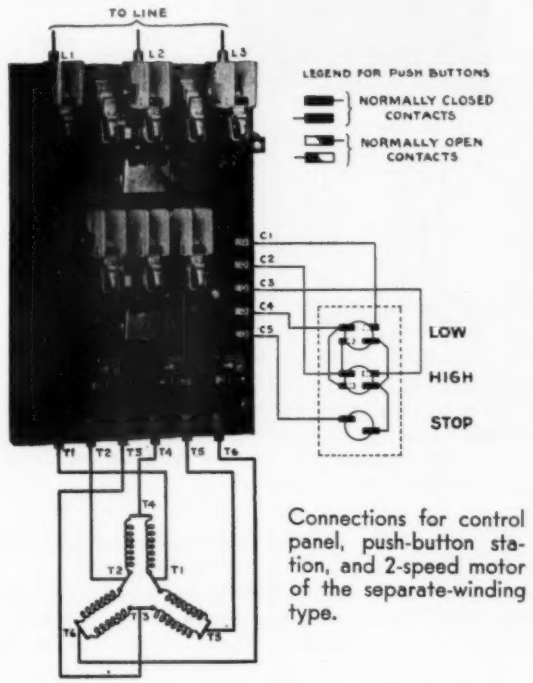
Speed Selection Through Push Buttons

Where automatic switching is used for the control of multi-speed motors, speed selection is obtained through push buttons. The number of main switches used on the control panel is equal to the number of speeds; and the number of poles provided for each switch will vary from three to six, depending upon the type of motor and the number of speeds. Each switch controls one speed and is in turn controlled by its proper push button. For example, operation of the low-speed button closes the low-speed switch. The second-speed push button closes the second-speed switch, and so on. Therefore, each switch and its push button is a starter in itself and gives the particular pole grouping corresponding to that speed.

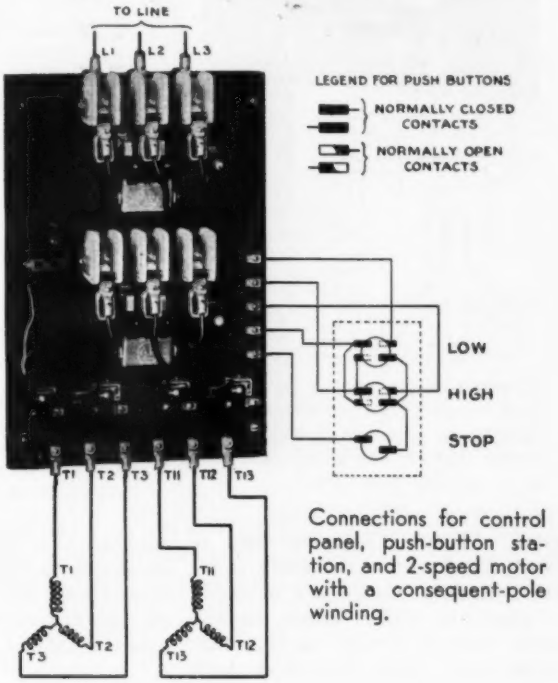
The push-button station used in connection with the automatic control of multi-speed motors contains one push button for each speed, and a stop button. Pressing the stop button disconnects the motor from the line regardless of the speed at which it happens to be operating.

In the case of large inertia loads the dynamic braking effect caused by a change from a high to a lower speed may be great enough to cause damage to the motor or driven machine. By pressing the "Stop" button and giving the motor sufficient time to slow down, then pressing the button corresponding to the new speed, this danger is obviated. By employing special auxiliary contacts on the switches and a special scheme of connections to the push-button terminals, change from any speed to a lower speed can be accomplished only through pressing the "Stop" button.

The switch panels shown in the accompanying diagrams contain thermal overload relays mounted at the bottom of the panels. These starters can also be supplied with a compelling slow-speed relay to prevent starting the motor on any except the low



Connections for control panel, push-button station, and 2-speed motor of the separate-winding type.



Connections for control panel, push-button station, and 2-speed motor with a consequent-pole winding.

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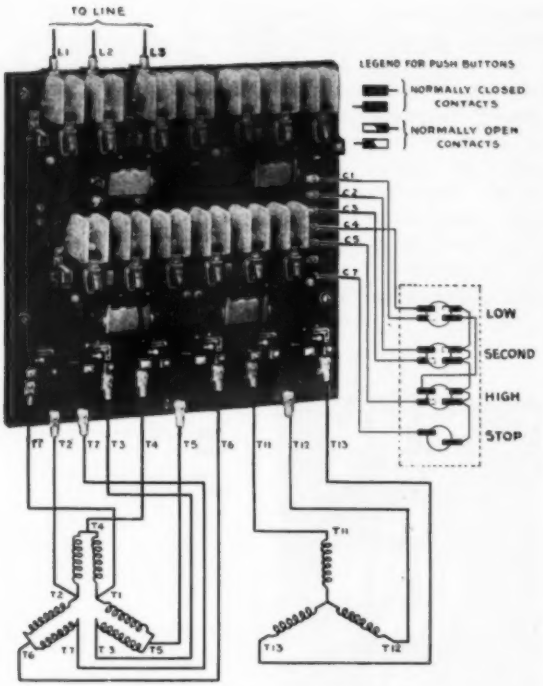
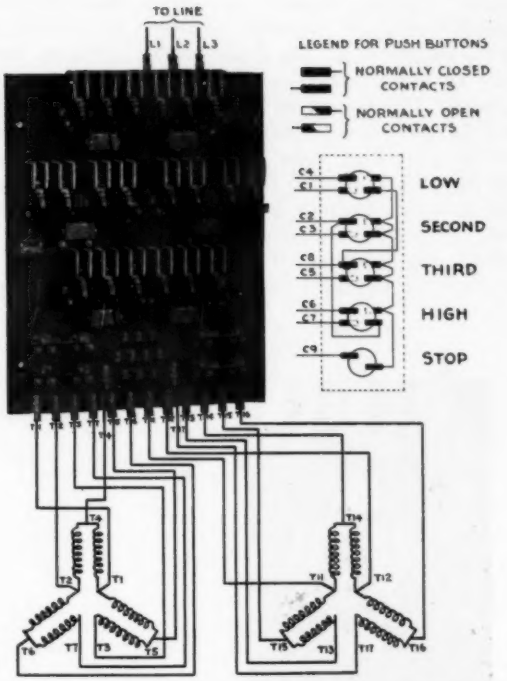


Connections for control panel, push-button station, and 3-speed constant-torque motor of the consequent-pole type. With this scheme of connections speed changes can be made in either direction, but only one step at a time.



Connections for control panel, push-button station, and 4-speed constant-torque motor of the consequent-pole type. With this scheme of connections, the motor speed can be increased or decreased only one step at a time.

speed. Where the motor load is mostly inertia, the compelling slow-speed start is particularly desirable to eliminate undue strains on the motor and the driven machine that would result from starting on high speeds.

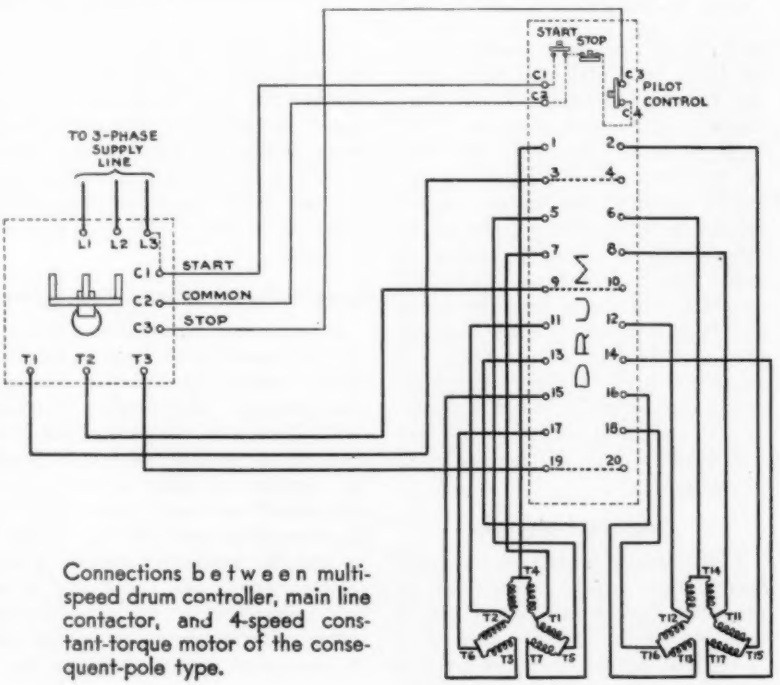
The rating of the switches in the diagrams shown is 15 hp. at 220 volts and 25 hp. at 440-550 volts.

By adding a timing relay in addition to a compelling slow-speed relay, it is possible to start a 2-speed motor on the second speed by merely pressing the second-speed button. This causes the first-speed switch automatically to close; and after a certain time interval, depending upon the setting of the timing relay, the first-speed switch opens and the second-speed switch automatically closes. The sequence of operation of the switches and relays takes place without any attention on the part of the operator after he has pressed the second-speed button.

By adding still another contactor, a time delay feature from high to low can be obtained for 2-speed starters, so that if the low-speed button is pressed while the motor is operating in high speed, a time delay is automatically interposed before the low-speed switch closes. This feature is desirable where, without it, the high dynamic braking effect might result in damage.

Speed Selection Through Manually Operated Drums

Drum switches for the control of multi-speed motors are available in several different types. For motors



Connections between multi-speed drum controller, main line contactor, and 4-speed constant-torque motor of the consequent-pole type.

UMI

up to 10 h.p. rating, drums can be had which will handle the motor current directly without the use of a magnetic primary switch, or a pilot contactor may be used to provide no-voltage protection, the contactor being operated through 3-wire pilot contacts in the drum.

Drums are also available with "Start" and "Stop" push buttons in the top of the drum for controlling a primary magnetic contactor. These drums are provided with pilot contacts operated by a star wheel, these contacts being connected into the push-button circuit. Each time the speed selector lever is moved, the star wheel opens the contacts, thereby opening the magnetic primary switch. To start the motor on the newly selected speed, the operator presses the "Start" button, which causes the contactor to close, giving the speed corresponding to the setting of the lever. Thus all switching of the motor current is done on the contactor, which is equipped with arc shields and magnetic blowouts, and the drum serves merely as a speed selector rather than a switch. Because no arcing is produced at the drum segments in this type of design, these drums can be used for motors of any rating up to the largest.

All the automatic starters and drums for multi-speed motors as described, are furnished with wiring diagrams as a guide to the installing wireman.

Data Needed

The motor manufacturer can be of considerable assistance in applying and installing multi-speed motors and control. The design of the control will depend upon certain motor data that must be accurately determined. The marking of the motor terminals, and how they are to be connected to obtain the different speeds, should be carefully noted, since this information is very important in selecting the proper type of control for the motor.

If full overload protection is to be provided, the actual current for each speed must be obtained either from the motor name plate or from the manufacturer, so the overload relays for each speed can be correctly adjusted. It is not satisfactory simply to calculate the current values from horsepower ratings, because generally the power factor is not the same for all speeds.

Classification of Wholesale Buyers

The electrical wholesalers of Oklahoma City, in cooperation with the local electrical industry, in recognition of the principal of distribution of products from manufacturer through jobber to dealer has applied to their business the definition of a wholesaler as found in paragraph 22 of the Federal Trade Practice Conference of the Electrical Contracting Industry as approved by the Federal Trade Commission and reading as follows:

The industry hereby records its approval of the definition of a qualified wholesale distributor to be one whose principal business is selling to the retail distributor, carries a well selected stock of merchandise, buys in suitable quantities, warehouses a reserve stock for retailers within a radius of economical distribution and convenience of service, resells in proper units to the retailer as economically as possible, assumes the credit risk and such other obligations as are incident to the transportation, warehousing and distribution of the products of the industry.

Wholesalers' Trade Classification

1. Licensed Electrical Contractors and Contractor Dealers.
2. Other Distributors—Handling electrical supplies exclusively.
3. Refrigerator Distributors—such material as is necessary for the installation of electrical refrigeration.
4. Oil Companies,
   (a) Producers
   (b) Refiners.
5. Pipe Line Owners and Operators—Material for construction, operation and maintenance only.
6. National Buyers,
   (a) Chain Stores.
   (b) Factory Branches—Material for maintenance and operation only.
7. Industrials Production — Manufacturing construction, operation and maintenance only.
8. Hotels and other Public Buildings —With full time licensed maintenance men for operation and maintenance only.
9. Department Stores; Hardware Stores; Drug Stores—Resale only, on items regularly carried in their stock.
10. Public Utilities—For use in connection with operation and maintenance only.
    (a) Electric,
    (b) Gas,
    (c) Ice,
    (d) Telephone,
    (e) Telegraph.
11. Special Service.
    Elevator—Such material as is necessary in signal work and from elevator cut off switch.
12. Railroad.
    (a) Steam,
    (b) Electric.
13. Appliances will be sold to established outlet for resale.
14. Welding electrodes, magnet wire, miniature lamps, insulating materials, heating and ventilating equipment to manufacturers, distributors and dealers handling this class of business and materials to be incorporated in manufactured products.
15. Governments.
    (a) City,
    (b) State,
    (c) Federal.
16. Electric Motor Works — Material for operation of motor business only.
17. Sign companies—Those contractors with electrical contractors' license only.
18. Radio Manufacturers, Dealers and Repair Men—Material for aerial and maintenance only.

UMI

Makes Hand-Me-Down High Line Pay

IN the Coeur D'Alene Valley, a group of farmers, 80 in number, had tried for 20 years to obtain electric service. The Washington Water Power Co. did not see the advisability of building a line to serve them. They had had the matter up with the public service commission, but without success. Nothing but a high tension line passed through the narrow valley and it looked as though this would be the case forever.

Just about two years ago, however, the power company decided to run a 120,000 volt line through the valley in place of the existing 60,000 volt line. The latter line, of the old triangle construction, was then to be taken down. J. W. Dunlap, owner of the Dunlap Electric Co., Kellogg, Idaho, got wind of this and immediately saw an opportunity. So he went to the power company with the proposal that instead of dismantling the old line he be allowed to rehabilitate it and make it serve those farmers. The line was about 7 miles long and he proposed to space all three No. 00 wires on the cross arm and string a fourth, three-strand copper, steel clad wire as a ground. This would give him a star hook-up and from that he proposed to take off lateral feeders ranging from one-quarter mile to five miles to supply districts. Twelve such laterals would be required.

The power company did not give him much encouragement at first, but finally said that he might go ahead if he could guarantee a certain fixed amount of revenue from the line for a period of five years. It so happened that the revenue they asked, figured on any reasonable current consumption per farmer, would necessitate Dunlap's having to sell every farmer in the valley. Not simply a reasonable percentage, but every one.

So here he stood at the first mile post and ahead of him lay the job of selling 100 per cent of 80 farmers on a proposition that would cost them, by his closest figures on the average, $325 for their proportionate share of the main line rehabilitation and construction of their laterals, in addition to the cost of their house and farm wiring. Regardless of the fact that they were all anxious to have service, this task of selling, in the face of conditions existing in 1931 and 1932 would have stumped almost anyone.

And there was yet another obstacle to be figured on in advance and included in the sales campaign among the farmers. It would cost money to rehabilitate the main line and build the laterals—capital, more than he had at his disposal. The power company would advance nothing, because they were still dubious of the final result. So it was necessary for Dunlap to include along with his contract with the farmers involving a signed agreement to take a certain amount of current, also a promissory note in each case for a given amount of money, which notes could be discounted at the bank to give him the necessary capital to go ahead with the construction.

The preliminary figuring and negotiations with the power company took about six months and then he was ready to go out and start his selling job. He is not able to tell himself just how he did it, except to say that he had his estimates and general plans all in the simplest form and had a clear, connected story to tell them, which showed just what they would get, when they would get it, and how much it would cost, spread over a definite period of time. Suffice it to say that he sold them one and all. The greatest leverage he had, perhaps, was to show them that this was probably the last chance they would ever have to get power into their valley and it was a case of now or never.

The final results of all this work are that early last Fall the power line was in working order, most of the laterals completed and almost all of the premises wired. Of those wired, Dunlap did about 75 per cent, the other 25 per cent being done by the farmers themselves, as there are no state restrictions to this in Idaho.

And what has all this amounted to for the Dunlap Electric Co.? At one stroke, even though it took time, they secured 80 customers. At least six men have been kept busy all the year and, moreover, they are still busy. A profit was secured on the materials used in all this construction work and house wiring. They have sold 100 per cent of the radios bought in this district since the work started, some appliances and a number of pumping plants.

J. W. DUNLAP

UMI

the forum

A place for the free expression of opinion on problems affecting the welfare of the electrical contractor, conducted in the belief that by bringing industry thought out into the open we may be paving the way for a quicker adjustment of these difficulties. Every reader is invited to participate in this Forum with discussion on any topic that so far has appeared, or upon any topic pertaining to the business of electrical contracting that he may wish to throw into these pages for discussion. The editors, while assuming no responsibility for any opinion here expressed, reserve the right to reject all or any part of any discussion that is an attack upon any individual, person or company, or which is not germain to this section.

EMPLOYEE TRAINING

Editor,
ELECTRICAL CONTRACTING:

I have just finished reading Geo. P. Svendsen's article "Employee Training the Bottleneck of Opportunity" in your December issue and I am writing this letter in appreciation of same.

I have been a contractor and I have been a teacher of electricity for the past ten years. This article is the most forceful one I have ever read from any man in the electrical industry in the interest of education for the electrical worker.

Your magazine is always available to my students every month but to make sure that they see this article I am going to read it to the class.

In the ten years I have been a teacher, I have seen a number of revisions in the National Electrical Code, wiring methods have become obsolete, numerous new devices have been introduced and I have had to be constantly on the alert to keep up-to-date with modern methods.

It has always been my practice to discard the old in favor of the new wherever possible, always keeping up-to-date. I find this method has the tendency to make a better, more interested student and he will be more valuable to his employer when he finishes school.

We cannot make a finished product out of the boy when he leaves school, but we do create a thirst for knowledge with the well balanced theoretical and practical training we give him in school. When times are good he is much sought after by electrical contractors and makes the best type of apprentice, advancing much more rapidly than those that have not had the opportunity of this training.

I would like to see more articles like this from other men in the electrical industry as it gives us new courage to go on with our jobs.

W. T. Taggart.
Harrisburgh, Pa.

MEETING BOOTLEG COMPETITION

Editor,
ELECTRICAL CONTRACTING:

The article on "How to Meet Bootleg Competition" which appeared in the October issue evidently has stirred up a little interest, for one correspondent writes as follows:

"Have read your article in ELECTRICAL CONTRACTING. You say the underwriters' inspectors cannot see everything on old jobs, which is true. I have worked at the electrical trade for the past twenty-five years and think it a shame the way the electrical trade is abused. I am a member of the union (Local No. ——) and we send our apprentices to school for four years and understand the other unions do the same thing. By doing this we try to make good electrical mechanics. We also try to do good work and to live up to all the rules. Here is a suggestion that, if followed, would get the matter before the eyes of all the people who use electric service:

"On the bills sent out by the electrical companies of each city have them print the following notice:

Be sure that your electrical wiring is in good shape.

Make sure that all and new electrical work has been inspected by the Fire Underwriters,—

The fire insurance companies do not have to pay for fire losses caused by defective electric wiring if no certificate has been issued by the Underwriters,—

Be sure that all electrical appliances are approved by Underwriters' Laboratories,—

Look for the Label!

Have your work done by experienced electrical contractors."

—

Our correspondent evidently thinks the time is almost here when our friends the Utilities will lend a helping hand to the rest of the electrical industry. Let us hope he is right! They are talking cooperation and it is to be hoped that they really mean it. But do they realize, as our correspondent does, that the above plan would be an aid to the contractors? Probably they would think the scheme would merely aid the insurance people which would, of course, never do. But broader thinking will prove that, through the betterment of wiring condition thus demanded by the public, the electrical contracting industry will benefit.

F. N. M. Squires.
Brooklyn, N. Y.

FOUR RED SEAL CONCLUSIONS

Editor,
ELECTRICAL CONTRACTING:

In putting over the job of getting 17,500 Red Seal homes in Toronto, the Electric Service League of that city has established many interesting conclusions:

1. That adequate wiring, even to the limited extent of the Red Seal specification, has a huge effect on appliance, lighting equipment sales, etc.
2. That it is possible so to popularize Red Seal idea with the public that speculative builders must comply with the standard.

(Continued on page 42)

UMI

electrical contracting

With which is incorporated The Electragist

S. B. WILLIAMS, Editor

THE NEW SPIRIT

DURING the past few weeks there has been a decided increase in requests for assistance in the formation of local associations. This is an excellent sign because it shows a changing spirit.

For the past two years the interest in association activities had been flagging and one by one local organizations ceased to function.

Now that air of hopeless helplessness is giving way to a spirit of trying to find the way out through association contacts and efforts. The electrical contracting business is making up its mind to save itself—and it will succeed.

JOINT CONFERENCES

TOWARD the end of November representatives of NEMA and NECA met in joint conference to iron out questions of policy with respect to local legislation. This month the wholesalers and the contractors are scheduled to hold an official joint conference for the purpose of discussing mutual problems.

This is a new procedure for the electrical industry but it is one that is bound to be beneficial to both sides. When there are two different opinions there can be nothing accomplished until some common ground is found.

We welcome joint conferences that are official and are entered into with mutual respect and confidence. We welcome conferences where both sides are willing to give and take—when both sides intend as gentlemen to make every reasonable effort to live up to their agreements.

ENERGY RATES

ON Staten Island, N. Y., there is a family in a rented home using 10,000 kwhrs. of electricity a year—and the bill is only $254. After paying certain nominal charges for readiness to serve, the energy rate is 2 cents.

At this rate this family is able to use electricity cheaper than other fuels for certain uses and the utility makes money.

It should not be difficult to sell electrified homes with energy rates like these.

THE NEW ECONOMICS AND LABOR

THE depression is bringing us some strange economic ideas but what seems strange today may be the accepted practice tomorrow. Whether we shall find that everything must be expressed in relation to horsepower and energy as the technocrats would have it, or whether we pay our bills in kilowatt hours, the new electric dollar suggested by the economists, is beside the point. The real thing that we have to face in all of these new thoughts is the continued reduction of individual effort.

There is no question about our being in a machine age. All of our economic progress demands greater machine production. From the standpoint of the individual this naturally means shorter working hours.

We cannot, however, approach this shorter work period with the same ideas toward labor that we now have. This changing economic condition must bring with it new and more progressive ideas with respect to labor.

Labor started as craftsmen, but the machine and the labor unions have reduced the work of the men to a trade. That was all right provided the output of labor could be standardized, but when skill and speed could be shown, it was not fair unless the individual could be compensated in proportion to his ability.

In the building industry, for instance, we have trades that are standardized and others that are highly skilled. One of the trades that requires skill is the electrical. There are some specialists in the big cities who do nothing but pipe work, for instance. For the most part, however, a journeyman wireman must be a highly trained mechanic in all phases of wiring.

When the shorter hours come are all of these men to be paid the same wage? Is credit to be given for skill or ability to do work quickly? Are young strong men to be paid the same as older and slower fellows?

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This is where the union must revise its thinking. If the new hours come, they must not be at the expense of the pay envelope. Our national prosperity depends upon the spending power of labor. Our national prosperity, also, depends upon efficiency—efficient use of labor as well as materials.

One of the great contributing causes of this depression was the excessive expansion in the cost of building. Part of this was due to financial manipulation and mismanagement. Another part of it was due to waste, the largest part of which occurred in labor. Some of this waste of labor can be laid at the door of management, but much of it can be attributed entirely to the standard wage.

If men were compensated on the basis of their skill, or their ability to do things quicker, the cost of building construction would be greatly lowered.

These are new times and they demand new methods and new ideas. In our opinion the ease of employment which was enjoyed in the post-war period will not return for many years. Labor wants to offset this with shorter hours. The public will be willing provided labor will show its good faith by guarantees of efficiency.

It is necessary, therefore, that electrical contractors and the I.B.E.W. begin to think about the future and how best to meet it.

We shall need better wiremen, by that we mean with a better technical training in order to install intelligently the new devices that are breaking into the market. We need men who will help to sell more wiring so that the contracting business will grow and their own future be assured. Who is going to train these men? Are not the contractors and the men equally interested?

We shall need different wage schedules to take care of kinds of work, skill, ability, etc. The unions must provide electrical contractors with men at a wage that will enable them to get more industrial work, more rewiring, more reinspection.

The unions must agree to a method of compensating wiremen which will prevent waste in labor on new construction. If this is serious now—and it is—think how much more serious it will be when hours are shorter and the rate higher?

If the effect of shorter hours is to raise construction costs, then let labor forget it because the public will not pay. If the cost is not to be increased the number of labor hours must be decreased and this can be done only by recognizing skill and efficiency.

Before any action can come the employers of union labor must be organized. Today they have no organization. Also, in organizing this time they must be sure that they represent the industry, not just a few of the big fellows. They must represent the union contractors of the United States.

To form a separate organization is folly. It has been tried and has failed. There is one way that can be successful and that is by reforming a union labor section of the National Electrical Contractors Association, not along the old lines but with separate additional dues and a capable paid staff of workers.

WHY SO STRANGE?

THREE electrical contractors submitted a joint bid for the construction of some high voltage transmission lines for a water district in California. These lines were to bring public utility service to a tunnel project, so the utilities also submitted bids. The news account recorded the fact that the bid of the electrical contractors was about half of the bids by utilities. What is so strange in that?

Is it strange that contractors should be able to do this class of work for so much less than the utilities? Surely anyone knows that the contractor is a better construction manager because he must make a profit on a competitive price.

Or, is it strange, if the contractors can do this work for so much less, that the utilities do not employ them more? Well, there may be something in that.

The utilities for the most part do this work themselves and probably do not concede that contractors are as capable as they are, or can do it for less money. The burden of proof, it seems to us, is upon the contractors to show their capacity financially and in an engineering way as well as convince the utilities of their ability to do the work for less money.

This, it seems to us, is a job that can be done individually by a few large contractors, or collectively by the national association. It might involve a cooperative advertising campaign in a publication going to public utilities. It might call for many pieces of promotional material. It, by all means, involves the spending of some money and if it is well done it should return handsome dividends.

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\\\ code chats ///

A MONTHLY DISCUSSION OF WIRING PRACTICE AND QUESTIONS OF INTERPRETATION, PRESENTED WITH A VIEW TOWARD ENCOURAGING A BETTER UNDERSTANDING OF THE NATIONAL ELECTRICAL CODE

CONDUCTED BY F. N. M. SQUIRES
ASSISTANT CHIEF INSPECTOR, N. Y. BOARD OF FIRE UNDERWRITERS

ARMOR OF ARMORED CABLE AS GROUND

In a run of armored cable and conduit, the cable being between the cabinet and the ground, is the armor of the cable a sufficient ground?

It is assumed that this refers to an interior system where cable is run for part of a branch circuit from a distribution panel and the circuit is then extended in conduit.

Rule 907-i says, in part, that "for grounding equipment, devices and the like the metal enclosures of the wires contained in or supplying them, may be used." Thus we see that the armor of the cable is sufficient.

WIRE CAPACITY SAME IN AIR AS IN CONDUIT

The table of Section 612-a of the Code gives the allowable carrying capacities of wires. I understand that the values shown are for wires when run in conduit. Would greater capacities be allowed if the wires are run open or if the wires are run open out of doors where the cooling effects of the air would be greater than when run in conduit?

The values given are set regardless of whether the wires are open or enclosed. While it may be true in some cases that there will be greater heat radiation effected when the wires are run in the open to that of wires run in conduit, there will also be many cases where the presence of the conduit around the wires will result in the greater dissipation of heat from the wires.

However, all the heat developed in a wire must escape through the rubber insulation before it can be carried off either by the air or by the conduit and therefore the current which would produce heat in the wire must be kept at such a low value that not sufficient heat will be generated to affect the insulation.

MAIN LINE AND SERVICE FUSES

When an installation consists of only a single branch circuit and the service fuses are accessible, is it permissible to omit the branch fuses or fuse? Does article 4 section 405-f require such fuses?

If service fuses are locked or sealed there must be fuses on load side of meter. These may be either the branch circuit fuses or feeder fuses and must be accessible. If there are feeder fuses it is assumed that there will also be branch circuit fuses which, of course, will be smaller than either the service fuses or the feeder fuses.

If the service fuses are locked or sealed and the installation consists of a single branch circuit there shall be branch circuit fuses on the load side of the meter and they shall be smaller than the service fuses.

If, however, the service fuses are not sealed or locked and are not located at the outer end of the service conduit, then 15 amp. fuses may be used for the service fuses, and may also be used to protect the single branch circuit.

Note that the last sentence of 405-f says "If such an installation, etc." The "such" refers to the installation described in the preceding sentence. If it had been intended to have smaller fuses than the service fuses on the load side of the meter for all cases where the installation consisted of a single branch circuit the word "such" would have been omitted.

LEGALLY INCLINED INSPECTOR: Leo McCormick for the past seven years chief electrical inspector for Kansas City, Mo., knows his electrical code, but in addition he devotes a part of his 24 hours to learning the code of Blackstone.

HAZARDOUS LOCATIONS, CLASS 1, GROUP D

We desire to obtain some information regarding a Class 1, Group D location as defined in Articles 32 of the code.

Article 32 of the code deals with locations which because of the nature of materials stored, handled, used, manufactured or in suspension in the atmosphere within it are considered hazardous from a fire standpoint. These locations are divided into four classes, according to the degree of dangers presented. The code does not, however, split these four classes up into further groups although certain appliances are approved for use in various groups which are sub-divisions of the above classes.

Class 1 locations may include dry-

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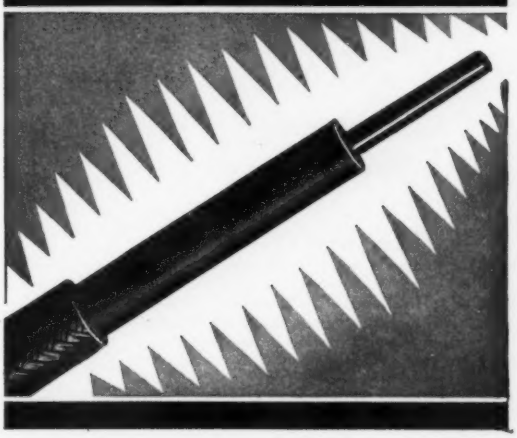

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Furnished standard with high grade thermometer.

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descriptive of above types and regular types for control of electrical illumination.

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cleaning plants, celluloid manufacturing plants, spray painting establishments, gas plants, paint or varnish factories or other places where flammable volatile liquids or highly flammable gases or mixtures are present.

Class 2 locations are not considered quite as dangerous and are those such as where combustible dust, or flyings may be present in sufficient quantities as to afford danger of explosions.

Classes 3 and 4 are less dangerous locations. The certain appliances referred to above are principally motors of a special type for use in hazardous locations and have some times been referred to as "explosion proof motors" or by a much better term as "explosion resisting motors".

This type of motor is approved for use in "Hazardous Locations," Class 1 Group (A, B, C or D), according to which group it is designed for. The group letters refer to hazardous locations as listed below:

Group A—Atmospheres containing acetylene.

Group B—Atmospheres containing hydrogen.

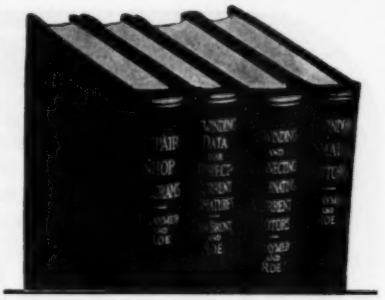
Group C—Atmospheres containing ethel ether vapor.

Group D—Atmospheres containing gasoline, common petroleum, ethyl, alcohol, methyl alcohol, acetone, and lacquer solvent vapors.

RECEPTACLE WITHIN A WALL

If Celotex is about 1 in. over a convenience receptacle which sets on a 1½ in. box, the receptacle being mounted right on top of the box, would this be a violation? The box is mounted on brick. A hole is cut in the Celotex to permit use of plug.

Although the connections of the receptacle are enclosed within the 1½ in. deep box and therefore probably very little hazard presented, the condition is not one which a conscientious electrical contractor would want to have on his work. The code calls for all outlet boxes to be flush with the finished wall surface or to protrude therefrom. As all that is necessary to do to have the box flush with the wall is to put a 1 in. piece of wood back of the box there is no reason for leaving the box within the wall where a draft might carry a spark into dust which is bound to collect in such places.



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THIS set of books should be on the shelf of every man who ever has to touch a motor for purposes of repairing it or changing it to meet different operating conditions. In shop language and with practical shop methods it covers every step in stripping, rewinding and connecting a.c. and d.c. motors of all kinds.

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- —how to make voltage in induction motors
- —how to make alternating-current windings for different frequencies
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TM—Electrically wound, meter base
TCO—Electrically wound, outdoor, conduit base
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Vice President, Earl N. Peak
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Contractors Organized for Industry Welfare

A NEW YEAR'S MESSAGE
from
President L. E. Mayer

I feel privileged again to have the pleasure of extending to our membership the Season's Greetings. I sincerely hope that the coming year will bring a great change from the retarded building activities of the present and that the entire business world will be greatly relieved from the burden of depression.

It would seem to me that through all of this, we have a wonderful opportunity to reflect on the past and prepare for the future business activities which are bound to be ours if we are ready and willing to undertake a larger job than we have had heretofore. Getting work up until the last twelve months has been fairly easy, inasmuch as the business was developed by other than our own industry.

I am fearful that the day of ease under which all of this was developed will be just a memory, at least with respect to the volume of business we can expect in the next two or three years. We all know that very little demand for building is developing, with the exception of Governmental requirements, which makes it necessary for us to look in other directions for construction business.

Notwithstanding these conditions, and realizing that they are facts, we must press on with a plan to overcome this difficulty, so that the contractor who has the business ability, both mentally and financially, can keep his organization during the next few months. Preparing a plan of salesmanship will become necessary in order to gain any volume of business sufficient to pay overhead. This indicates that it will become necessary to apply a greater sales energy to the contracting business than has ever been done before, and will necessitate a promotional plan by contractors to induce owners who have allowed their buildings to become obsolete electrically, to reconstruct them with modern materials and devices.

In order to accomplish this, it will be necessary to get the backing of all the electrical industry, including the utilities, manufacturers and the wholesalers, united behind the contractors in an effort to promote such a program, which will be beneficial not only to the contractor but also to those other groups.

I, therefore, believe it is very important that we get behind the movement of building up our own numerical strength within our Association, realizing the importance of sustaining the wonderful organization that we now have because of its importance to the contractors and to the rest of the electrical industry. It is reasonable to expect that all contractors not affiliated with our Association should become members. This is an opportunity for working out our problems at this time, and no better means can be devised than by the guidance of the National Association, working through contacts with the other branches of the industry. We know that most satisfactory results can be obtained by our willingness to participate with the other branches in the promotion of all things that will make for better contractors and for a better electrical industry.

Let us face the New Year with determination to build a stronger Association, a united industry and greater business opportunities.

JOINT CONFERENCE ON REGULATORY LEGISLATION

The Joint Conference of Committees of NECA and NEMA, held November 29, 1932, to discuss the policies of these two national associations on regulatory legislation, resulted in complete accord as to the need for industry guidance of local legislative activities and in the formulation of a program to coordinate such guidance through field work and model ordinances acceptable to all the national industry associations.

Tentative drafts of such model ordinances have been prepared and are now being studied by both the technical and legal departments of the two organizations. These will also be submitted to the NELA and other industry elements for review, in order that in their final form they may have the full approval of the industry when adopted to local needs.

The Joint Committee agreed that

Use

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Because of their many uses, convenience outlets require more consideration than any other type of outlet in the home, industrial or commercial structure. With the complete line of G-E outlets, electrical contractors are prepared to meet every installation requirement.

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Easy to Install	Built for Life Time Service

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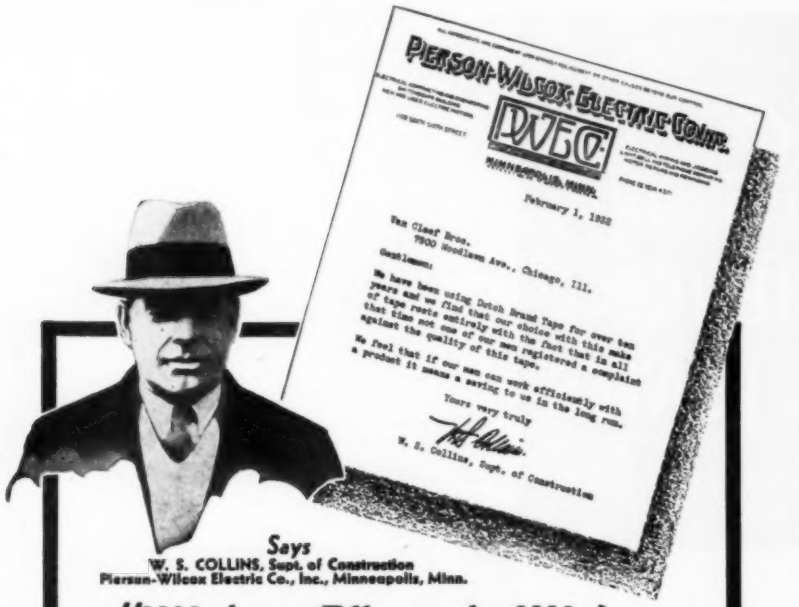
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Yours very truly
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Says
W. S. COLLINS, Supt. of Construction
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RIGHT now when every contractor has to figure close to get a job, the saving of time and material is important, even on little things. DUTCH BRAND Friction Tape handles so easily, does such a clean permanent job without the waste of an inch of tape, that using it is real economy. "Extra Service" is what DUTCH BRAND Friction Tape will give you and here are the reasons:

1. Manufactured by our own 4 ply saturation process. Not 2 coats or 3 coats of compound, but 4 plies of rubber uniformly applied that give it exceptional adhesiveness and long life in any climate.
2. The 4 ply process eliminates pin holes and insures extra insulating safety. One thickness of this tape resists 2200 volts.
3. The edges do not fray. Every inch is clean cut and usable right down to the core, no waste.
4. It is made on a base of tough close-woven sheeting that brute strength can't easily break.
5. Its great adhesiveness is always fresh. It lasts and is not of the gooey or messy type. It won't dirty the hands.
6. It is neatly packaged in small sizes for the consumer and shop sizes for the contractor.

Just by clipping the coupon below (and you won't be pressed to buy) we will send you full size free test rolls of tape so you yourself can learn what "Extra Service" really means and how it can help you cut costs.

DUTCH BRAND Friction Tape, Rubber Tape and Soldering Paste are sold by electrical jobbers everywhere

VAN CLEEF BROS. Established 1910
Manufacturers DUTCH BRAND Friction and Rubber Tape and Soldering Paste
Woodlawn Ave., 77th to 78th Sts., Chicago, U. S. A.

DUTCH BRAND Soldering Paste
A scientific mixture. Cleans as it works. Holds solder fast. Less paste required per job.

DUTCH BRAND Rubber Insulating Tape
Fuses instantly without heat. Molds into one solid piece. It s-t-r-e-t-c-h-e-s without breaking because it contains 20% more live, new rubber.

Van Cleef Bros.
Woodlawn Ave., 77th to 78th Sts., Chicago, Illinois
Gentlemen: We would like to test the "Extra Service" qualities of the following DUTCH BRAND products:
☐ Friction Tape ☐ Rubber Tape ☐ Soldering Paste
Name.....
Kind of Business.....
Street Address.....
City.....State.....
Jobber's Name.....

DUTCH BRAND FRICTION TAPE

so far as possible uniformity of regulatory legislation is most desirable, and that whereas it is immaterial that a local ordinance finally proposed for adoption contains specifically the clauses suggested, it should effectively embody the essentials necessary to the general public and industry interest.

NEMA and NECA are in accord that such an essential is the establishment of the National Electrical Code as prima facie evidence of approved materials and methods of wiring. This in no sense proposes that all provisions of the Code must be applicable throughout all sections of a jurisdiction. There is recognized the need for limitation based on location and character of occupancy, and that decision as to such limitation must lie with the local authority. It is urged, however, that, in the interest of uniformity, such limitation be held to Code provisions and not involve special requirements.

With reference to licensing the NEMA Committee pointed out that their only interest in such ordinances is in having them so drawn and impartially administered that they will not interfere with the orderly processes of distribution. It was mutually agreed that the essential elements of such licensing ordinances are:

1. *Adequate examination of applicants for license to determine their qualifications and fitness for executing the class of work covered by the license applied for.*
2. *The constitution of an examining board on a basis assuring impartiality.*
3. *Required meetings of the examining board at stated reasonably short intervals.*
4. *Specified designation of the duties and powers of the examining board.*

Tentative drafts have now been prepared for the following model ordinance forms:

Inspection.
Sales Control.
Licensing.

When these separate draft forms have been approved by the Joint Committees of NECA, NEMA, NELA and NEWA, combination ordinances will be drafted embodying all or any combination of the three forms in a single ordinance, for the guidance of the local authority planning the adoption of a general regulatory ordinance.

SATISFIES *me* . . .

Because it gives *lasting* service—provides an extra margin of safety and dependability—and is easy to handle, fish and strip—Roebling Rubber Covered Code holds old friends and is constantly winning new ones.

It is composed of high conductivity copper, well tinned; rubber insulation with good aging characteristics; and a tough, strong cotton braid thoroughly filled with moisture-proof compound. You will like the smooth finish, which facilitates "fishing" through conduit.

The nearest Roebling office listed below has complete stocks of Rubber Covered Code and many other types of electrical wires and cables. It would be very glad to receive your order, or your request for further information or samples.

Rubber Covered Wires and Cables : Braided and Leaded : Code; Intermediate; 30% » Power Cables : Paper; Cambric; Rubber » Slow-burning Wires and Cables » Weatherproof Wires and Cables » Parkway Cable » Police-Fire Alarm Cable » Portable Cords » Annunciator Wire » And a wide variety of other wires and cables.

JOHN A. ROEBLING'S SONS CO. • TRENTON, N. J.

Atlanta Boston Chicago Cleveland Los Angeles New York Philadelphia Portland, Ore. San Francisco Seattle Export Dept., New York, N. Y.

ELECTRIC WIRES **ROEBLING** AND CABLES

CONTRACTING news

INFORMATION OF INTEREST TO ELECTRICAL CONTRACTORS CONSISTING OF ITEMS OF NEWS, SHORT ARTICLES, PRACTICAL IDEAS, ETC., OUR READERS ARE INVITED TO CONTRIBUTE TO THIS DEPARTMENT

INSPECTORS TO EDUCATE PUBLIC

The New York Chapter of the Eastern Section, I.A.E.I., has appointed a committee for educating the public on the hazards of electricity.

SEATTLE HAS CODE SCHOOL.

An electric code school is being conducted under the auspices of the Electric Club of Seattle. Ten meetings are to be held starting December 19 and concluding February 27. The enrollment is approximately 100 men.

WHOLESALERS AND CONTRACTORS PLAN CONFERENCE

A Joint Conference of committees appointed by the National Electrical Wholesalers Association and NECA has been tentatively set for Wednesday, January 18, to be held in New York City.

The conference is planned to discuss not only distribution problems affecting the interests of the two industry groups, but also to consider market development possibilities through industrial modernization, reinspection and broad industry sales cooperation.

The committee appointed by the wholesalers for this conference includes George E. Cullinan, vice president Graybar Electric Company, New York as chairman; J. L. Buchanan, president General Electric Supply Corporation, Bridgeport; B. W. Clark, general manager Westinghouse Electric Supply Company, New York; Robert Beller, president Beller Electric Supply Company, Newark; and E. Donald Tolles, managing director, National Electrical Wholesalers Association.

The NECA committee consists of L. E. Mayer, president NECA, Chicago; Louis Kalischer, Brooklyn; H. B. Frazer, Philadelphia; A. C. Brueckmann, Baltimore, and L. W. Davis, general manager NECA.

MOTOR DEALERS REELECT ADAMS: Horace Adams, proprietor of the Farnsworth Electric Co., San Francisco, Cal., seems to have a permanent post as president of the San Francisco Motor Dealers Association, just having been reelected to the office for the fifth time. James Powers, Enterprise Electric Works, was named vice president and Kieth Noble, of Buzzell Electric Works, who has held the office of secretary and treasurer since the organization was formed, was again reelected. The organization was shown to be in excellent condition, and to have made material progress in the stabilizing of motor conditions in the area. Mr. Adams, right, is shown with E. J. Douglas of the Enterprise Electric Co., one of the active members of the motor dealers group.

CONTRACTORS TO BUILD TRANSMISSION LINE

Acceptance of bids for the first section of temporary power line along the Colorado River Aqueduct, found three electrical contracting firms of Los Angeles, who submitted a joint bid, successful in having their bid accepted for supplying labor and certain materials. Bids accepted involve construction of 45 miles of 66 kv. transmission line; about 30 miles of 33 kv. line, and three substations to supply power for boring the 13 mile San Jacinto tunnel.

The three electrical contractors have agreed that the Quality Electric Company will build the substations, Newbury Electric the transmission line and H. H. Walker will handle purchasing, accounting and payroll. The original plan of the District was to do the work on force account, but upon assurance that electrical contractors were financed and organized to do the work and that it was within their legitimate field, the whole matter was thrown open to bidding. It is significant that the bid of this contracting group was less than half the bids of two power companies and considerably lower than the District's own bid.

NIAGARA HUDSON TO GO OUT OF MERCHANDISING

Operating companies of the Niagara Hudson System have announced a new promotional plan for the development of residential and farm markets, coupled with work in cooperation with merchants who sell electrical and gas appliances. The new plan which provides for the eventual discontinuance of the sale of electrical and gas appliances by the system operating companies and the concentrating of efforts on developing complete home use of gas and electricity becomes effective progressively by districts throughout the territory served starting on January 1, 1933, in Utica and Glens Falls.

In explaining the new service plan, Merrill E. Skinner, Chairman of the Sales Promotion Committee, points out that the companies plan intensive promotional work to be undertaken for the development of complete home use of electricity and gas, by offering consulting service to customers on adequate wiring, modern home making, and home lighting.

UMI

Write for this.. CATALOG

64 PAGES of Practical Solutions

—for your medium duty Indoor High Tension problems. Printed in two colors with reproductions of blueprints and tables giving complete details and prices.

...JUST OFF THE PRESS

THE PLANT
Behind the Catalog

By an aggressive sales and advertising program, this company is contributing its part towards the rapid restoration of normal conditions. And these efforts are being signally rewarded with a steady flow of desirable business. We make a complete line of Indoor High Tension Equipment for all capacities and we fabricate STEELCUBE Housings for Indoor and Outdoor High Tension Service.

POWERCRAFT
CORPORATION · 2215 DEKALB · ST. LOUIS, MO.

Mail This Coupon

POWERCRAFT CORPORATION,
2215 DeKalb Street, St. Louis, Mo.

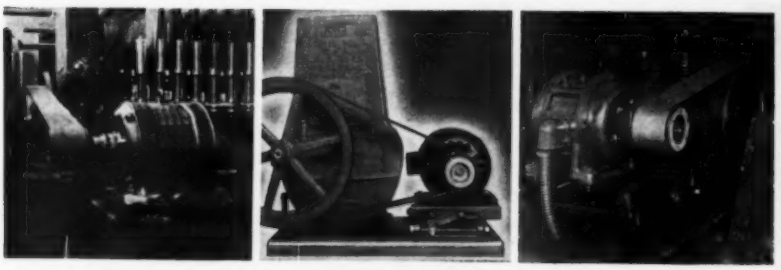
Gentlemen:
Please send us your new 64 Page Catalog just off the press. EC 1-33

Name .....

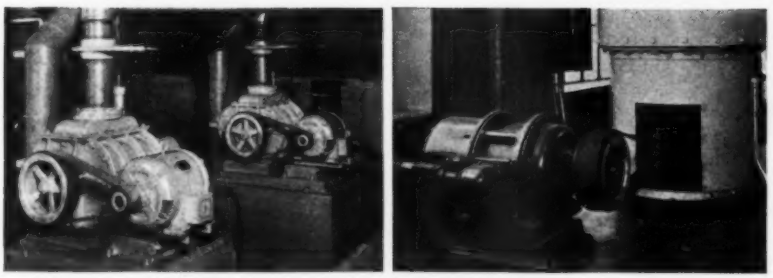
Company .....

Address .....

City ..... State .....



100,000 H.P. of ROCKWOOD DRIVES



● ROCKWOOD Short-Center Drives are now in industrial use—for individual machine drives, group drives and lineshaft service—to the extent of nearly 100,000 motor H.P.

Impressive as this record is, it is only a **start!** It merely suggests the **potential** volume of ROCKWOOD Drives for 1933 and the years to follow. No other type of power transmission has met with such universal acceptance.

One salesman's report says: "In two days here at..... we dug up inquiries for two motors and two wiring jobs for .... Electric Co., besides the motor pulleys and belts." So in addition to selling ROCKWOOD Drives, the ROCKWOOD Drive demonstrating model (which we lend to active dealers) helps sell motors and other drive equipment.

A splendid opportunity exists in many territories for dealers to become active on ROCKWOOD Drive selling now. The pioneering has been done, yet the market has scarcely been scratched. If you are interested, tell us your selling "set-up," and we will send full information.

THE ROCKWOOD MANUFACTURING CO.
INDIANAPOLIS, IND.

ROCKWOOD
SHORT-CENTER FLAT BELT DRIVE

Stock sizes for motors from ¼ to 100 H.P. Larger sizes up to 500 H.P. supplied promptly.

ROCKWOOD PULLEYS THAT PULL

Immediately available in 2540 stock sizes. Other sizes, up to 72" diameters, made promptly to order.

ROCKWOOD BELT-PULL

Reconditions old and worn belts and **makes them pull.** Distinctly different from old-fashioned belt "dressing."

PUSHES SEASONAL SPECIALTIES: W. E. Barry of Topeka, Kans., works for additional business according to the season. During the spring house-cleaning period he sells refixturing; summer, ventilation and fan business; fall, furnace fans; winter, air heaters for bathrooms, etc. He started with this firm 32 years ago as an employee and has been the owner for the past fifteen years. During this entire time the shop has remained at the same location.

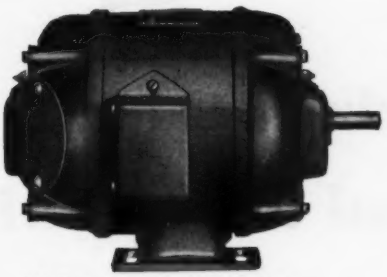
The new service plan contemplates an intensive training course for the companies' field representatives to help customers on electrical and gas matters in an impartial manner and without obligation in their work with housewives. Company stores will be converted into continuous electric and gas appliance shows with practically all standard makes of appliances on display which are offered for sale locally. Appliance selling, however, will be done by the local appliance merchants.

The extensive market analysis made by the companies in nearly every community served by the lines, indicated that local merchants of the territory served were sufficiently organized with stock and selling personnel to be able to meet customer needs if supported by an aggressive promotional activity by the companies.

C. J. GEISBUSH

Cyril J. Geisbush died at his home at Jamaica, N. Y., suddenly on December 31.

Mr. Geisbush, affectionately known as "Cy" throughout the electrical contracting industry, at the time of his death was business manager of Electrical West with offices in New York. Prior to that, as manager of the Southern California Electragists, he developed one of the largest and strongest local organizations ever to exist in the contracting field.



1/6 Horse Power Century Repulsion Start Induction Single Phase Motor.

Protection... Century Fractional Horse Power Motors are specially designed so that dirt, falling objects or dripping water will not enter the motor. One look tells the story.

Workmanship... Neat, Careful Workmanship is evident in every detail. Century motors are built by specially trained mechanics, many of whom have been with the Company since it was founded in 1904. They know how to build motors that last.

Materials... Careful Selection of Best Materials—strong rigid frames, electrical sheet steel laminations, steel shafts ground to sizes and polished on all bearing surfaces, thick walled phosphor bronze bearings and the Century Wool Yarn System of Lubrication—

Century MOTORS

These are only a few reasons why Century Motors give years of uninterrupted service, in all types of installations, in all climates, in all parts of the world. Whether you buy or sell motors be sure to insist on Century.

CENTURY ELECTRIC COMPANY, 1806 PINE STREET, ST. LOUIS, MO.
Offices and Stock Points in Principal Cities

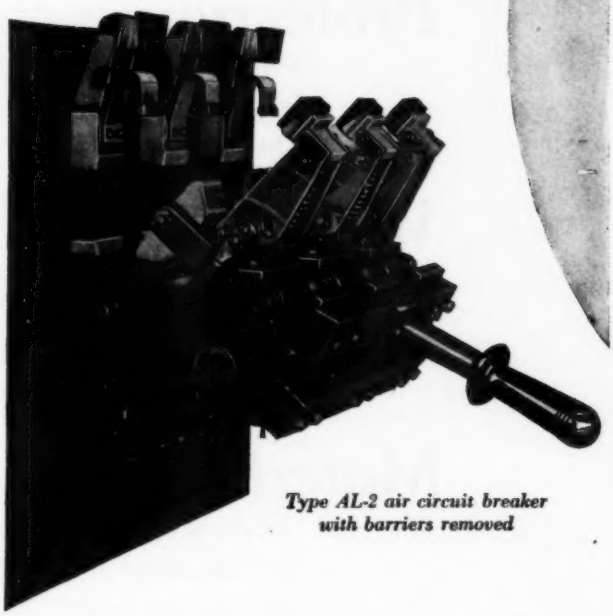
CENTURY MOTORS ARE BUILT IN ALTERNATING AND DIRECT CURRENT, SINGLE PHASE, POLYPHASE, SPLIT PHASE, MULTISPEED AND SPECIAL MOTORS RANGING IN SIZE—DEPENDING ON TYPE—FROM 1/250 TO 600 HORSE POWER, 3600 R. P. M., ALSO MOTOR GENERATOR SETS, ROTARY CONVERTERS AND FANS.

UMI

Strength

characterizes these new switchboards and air circuit breakers

Switchboard is delivered completely assembled, ready for immediate installation



Type AL-2 air circuit breaker with barriers removed

In this new line of switchboards—for buildings, power station auxiliaries, and industrials—the General Electric Company has given special attention to strength of construction. And the strength of the structure is matched by the strength of the air circuit breakers it houses.

Varieties available include:

(A) dead-front boards with individual breaker enclosures

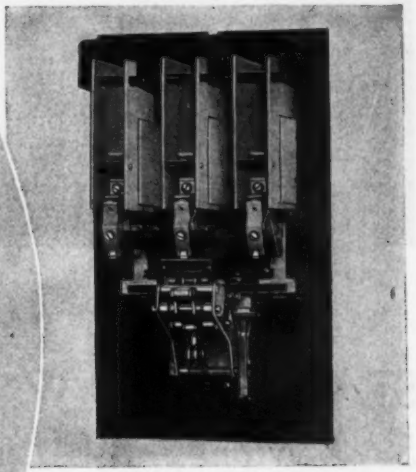
(B) dead-front boards with individual breaker enclosures and enclosure for buses and connections

(C) dead-front boards with draw-out-type breakers in individual enclosures and also enclosure for buses and connections.

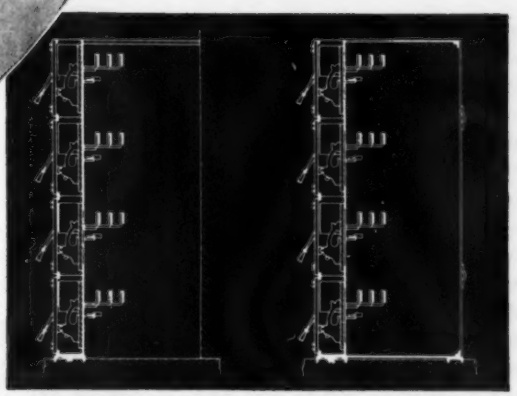
Breakers used include the new AL-2 and AB-2 types and the CP-108. Capacities available extend to 600 volts, 4000 amperes, alternating current—750 volts, 6000 amperes, direct current. They have high interrupting ability, unusually good

G E N E R A L

Dead-front switchboard with complete enclosure



Type AB-2 air circuit breaker



Dead-front switchboard

Dead-front switchboard with complete enclosure

contact characteristics, and mechanical strength confirmed by tests.

Consider the economy in buying equipment that will last, that will require very small installation expense and little maintenance, and that offers full protection to service and safety to operators. General Electric Company, Schenectady, N. Y.

463-22

ELECTRIC

Greenlee Bender in operation on standard conduit, also an installation where all bends were made on a Greenlee.

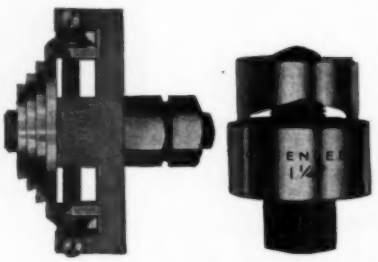
START THE NEW YEAR RIGHT—
Save Money By Using Greenlee Tools

IN times such as these, it is more important than ever that a profit be made on every job. And with the severity of existing competition, the best way to do this is to be equipped to save on the cost of installation.

As proof of the ability of Greenlee Hydraulic Conduit Benders to make real savings, it is pointed out by many users that they pay for themselves on any job of reasonable size. But regardless of this, the points of special importance are that they bend conduit quicker and easier than by other methods; that they make smooth, even bends; that they eliminate the need for many manufactured fittings; and that they make it easier to pull in wire and cable.

Knowing these things, it is easy to reason that a Greenlee Bender is, decidedly, a good investment—something that every contractor should be interested in.

Greenlee Hydraulic Bender with attachments for bending thin-wall steel conduit. Bends 1¼, 1½ and 2-inch sizes, easily, quickly, and without crushing.



Greenlee Knockout Tools

Used for enlarging holes in cabinets, panel boards, etc. Leave clean, round holes. No filing or reaming. Punches make enlargements for ½ to 2-inch conduit. Cutter makes enlargements for 1½ to 3-inch conduit.

Mail This Coupon Today

GREENLEE TOOL CO., ROCKFORD, ILL. Date.....

Please send complete information on Greenlee Conduit Benders and Knockout Tools.

Name.....

Address.....

City..... State.....

My Jobber is.....1-33

CALIFORNIA GROUP SETS UP INDUSTRY PROGRAM

A fourteen-point program was enunciated by the Electrical Contractors' Association of Northern California at the special meeting held in Oakland, Calif., December 8, to reorganize the Northern Chapter of California Electragists in conformity with the new national set-up and name.

In facing the future, the newly reorganized association sets itself to constructive, yet aggressive, accomplishment of fundamental improvements necessary to bring the electrical industry back to a plane of fair dealing, profitableness to all branches of the industry, and common sense.

In so doing it calls upon all electrical contractors to:

1.—Put their own houses in order—Which means to become better business men, unmoved by the blandishments either of false sales schemes or the falser race for jobs regardless of cost. It means considering the business as a business, not a gamble.

2.—Analyze costs of doing business and make these analyses available to the industry so that there no longer can be any excuse for not recognizing these costs in the margins or discounts provided those who sell or install equipment.

3.—Defend their own businesses and future by defending the industry against such outside rackets as foreign lamps and lighting equipment, trick gold-brick electrical products, gas engine substitution, and uneconomic municipal ownership schemes, which in the long run reflect discredit upon the industry and bring only temporary, if any, business advantage.

4.—Recognize that this is an age of change, that processes as well as methods are undergoing great changes, and that it may be necessary to alter contracting to meet these new developments or conditions.

The association urges upon manufacturers more consideration in the following respects:

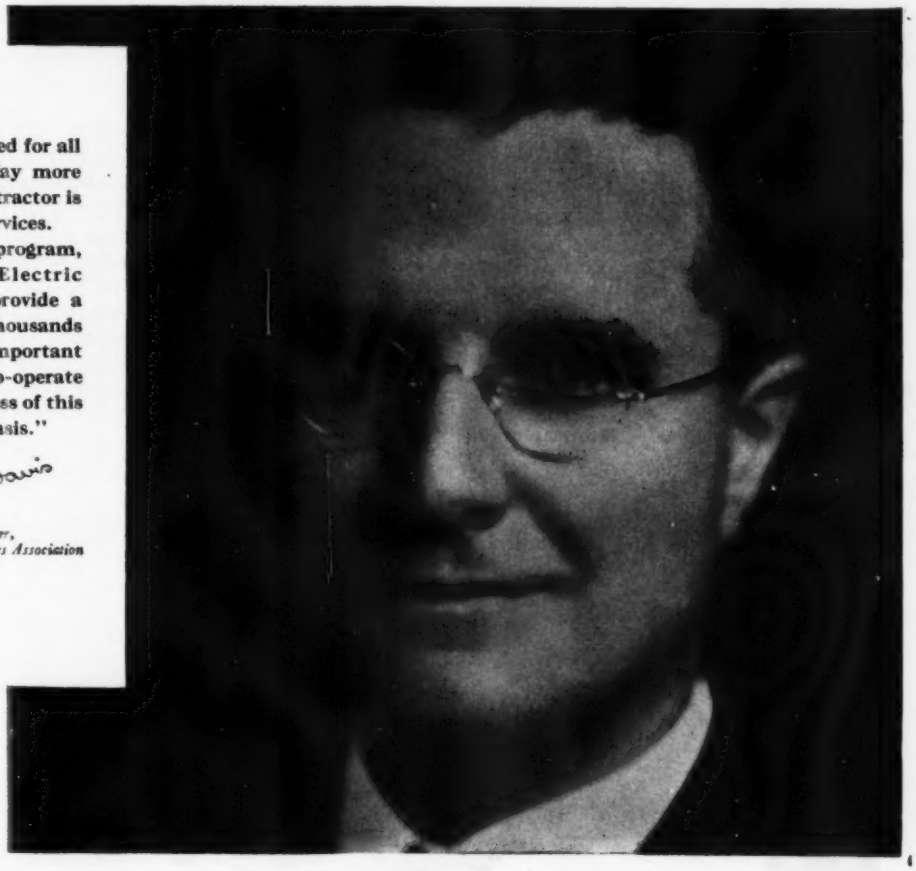
5.—Recognition of the ultimate soundness of supporting and making business profitable for a high-grade type of contractor.

6.—Margins and discounts be established on stable lines of merchandise or equipment based upon the true facts as to cost of distributing such products and not guesswork or hope.

7.—That distribution of their products be reasonably and intelligently restricted to the number consistent with the market, and, furthermore, that consideration be given by them to their competitors, big or small, recognizing that they too must be allowed to share in the market.

8.—Arrival at some reasonable classification of trade and that consistency be followed to the extent of making the same classification for wholesalers operated by such manufacturers.

9.—That a real analysis be made of whether or not direct selling really pays when it brings in its wake a demoralized



"The greatest need for all industry is a market. Today more than ever the electrical contractor is seeking an outlet for his services.

"The three-year range program, known as the National Electric Cookery Campaign, will provide a market for the services of thousands of contractors. It is vitally important that electrical contractors co-operate in assuring the fullest success of this campaign on a *profitable* basis."

Lawrence W. Davis

General Manager,
National Electrical Contractors Association

YOU have a *Vital Interest* in this BIG JOB

EVERY range sold means a home to be wired . . . a job for *you*. To you the success of the national 3-year drive to sell one million ranges means *more business* . . . business big enough to be worth going after.

And the business is there!

For electric cookery is already an established and proved success in over a million homes. To millions more it offers a truly *modern* means of cooking.

Our job is to convert that powerful, latent demand into actual business —*now!*

Selling the idea of electric cookery is a big job. It can't be done overnight. It can't be done effectively without the powerful support of all branches of the electrical industry in a co-ordinated effort.

Local organization is essential . . . but without you no Local Cookery Council can function effectively.

Join now with your utility, electrical dealers, and all other natural outlets for electric ranges. Get your own Local Council operating. Make mutual co-operation and "profits for all" the basis of all local electric range activities.

The national advertising is already prepared. It will not be released until a sufficient group of Local Electric Cookery Councils (or corresponding co-operative units) has been organized to cash in on the business it will create for us all. Your action will determine when this advertising gets under way.

For active co-operation and assistance, address your inquiries to the National Electric Cookery Council, 420 Lexington Avenue, New York City.

NATIONAL ELECTRIC COOKERY COUNCIL

UMI

Get All Your Gas and Vapor-Proof Fittings, Heavy Duty Plugs and Receptacles from

RALCO—

All Ralco products are the finest made—they conform to Underwriters' specifications and are sold at a price your customers can afford to pay—

Not only that but Ralco has a complete line of these products from which you can select to fit any or all requirements. Large stocks carried at factory.

Ralco is a leader in the development of gas and vapor-proof fittings and heavy duty plugs and receptacles. Below are a few of the individual items of this complete line. Standardize on Ralco—it will pay you and your customers.

Bulletins descriptive of the complete line are available—send for them.

ORDER FROM YOUR JOBBER

RALCO MANUFACTURING COMPANY
125 N. ALBANY AVE. CHICAGO, ILL.

contractor, wholesaler, price, and quality situation and increases sales cost by duplicating and triplicating sales effort.

The association urges upon wholesalers besides:

10.—A determination whether the future functioning of a wholesaler does not call for a decision as to the field and extent of wholesale distribution and its limitation so that it may be determined whether the wholesaler cannot re-establish themselves as the buyer and complete supply source for the contractor, becoming the agent of the contractor a little more and of the manufacturer less.

11.—That jobber salesmen's activities be promotional and compensated for upon that basis, so that the temptation to sell direct now presented in their compensation scheme will be eliminated and that they can better fulfill their function as the advisor, buying agent, salesman and expert on a product which the contractor needs to help him in his sales and business development.

To the central stations, the contractors urge that the excellent policies enunciated by the officials and head offices as respects merchandising be given a better chance to find their way into actual practice by:

12.—More careful consideration of the profitableness to cooperating dealers of some of the sales programs prepared by utilities.

13.—More consideration, when work is to be offered, as to the ultimate advantage of favoring those whose efforts in the industry are consistent with good service to the public. In other words, the ultimate economy of cheap wiring or of cheap contracting should really be studied as opposed to the value of the support of good substantial contractors.

To the industry, through the Pacific Coast Electrical Bureau, the contractors address this plea:

14.—That the functions of each branch of the industry be better defined and understood and that in campaigns, slogans, sales programs, Red Seal activity, or other work undertaken by the Bureau requiring industry and contractor participation that the tests of profitableness and real and permanent value to the industry be considered.

PLAN FOR PROMOTING ADEQUATE WIRING

A committee of the Washington, D. C., Electric League, after making a long study of the Red Seal Plan, has recommended that the name "Red Seal" be dropped and has suggested a plan for promoting adequate wiring.

The committee, which was headed by J. T. Kirchner, reported that the Red Seal Plan had failed in the following details:

1. Provision for adequate copper and service requirements for present and future use.
2. Provision for proper grade of material and workmanship.

3. Failure to divert resulting business into channels from which the promotional funds were secured.
4. Provision for fixture installation in keeping with the general standard of the wiring job.

In its report the committee recommended that the name "Red Seal" be dropped, that the league divorce itself from the national activity and that a new name and symbol of adequate wiring be adopted. It was recommended that the granting of certification be predicated not only upon specifications and workmanship, but upon the work being done by and the materials furnished by league members.

PAUL H. JAEHNIG

Paul H. Jaehnig of Newark, N. J., one of the pioneers of the electrical construction industry, died at his home on December 4 of apoplexy.

Paul H. Jaehnig

Born in Saxony in 1871, Mr. Jaehnig's association with the electrical industry dated back to 1888 when he went to work under William J. Hammer, whom he helped at Cincinnati to install the electrical equipment for the Centennial Exposition of the Middle Atlantic States. Next he was employed at Edison's laboratory preparing the Edison Exhibit for the Paris Exposition of 1889, which he accompanied to Paris. He started business as a contractor in 1893 in Newark.

Mr. Jaehnig took considerable interest in association work and for some time served on the executive committee of the national association.

Add this organization to your own

Above—Location of Wagner's 26 branch offices.

At Left—The huge Wagner plant at St. Louis

by handling Wagner Fans

When you take on the product of any manufacturer and program the expenditure of time, effort and money to develop sales for that product, you naturally give consideration to the staying qualities of that manufacturer. Perhaps you investigate the manufacturer's financial condition. All of this is good business.

Past performance is about the only yard stick by which you can measure the staying qualities of any manufacturer.

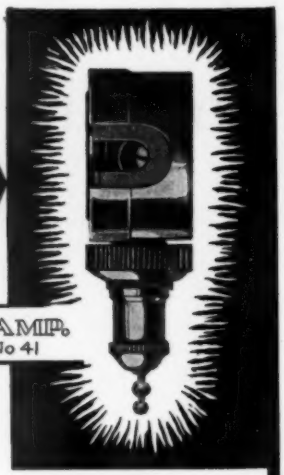
Wagner offers its record of forty years' service to the electrical industry as evidence of its staying qualities. In those forty years Wagner has built a national reputation and acceptance of its products. Wagner offers the cooperation of a nationwide organization, 26 branch offices, service stations and fan warehouses.

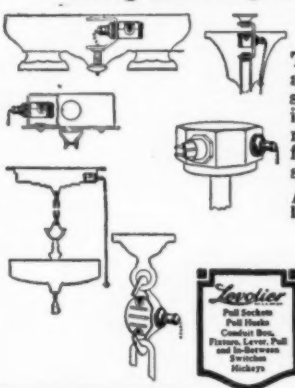
Wagner Electric Corporation
6400 Plymouth Avenue, Saint Louis, U.S.A.

MOTORS FANS TRANSFORMERS BRAKES

F133-1

Levolier
THIN MODEL
WINS!
—where Service and Adaptability Count





The Levolier Thin model Switch No. 41 is an achievement in small switches. The above actual size picture shows it is less than 5/8 of an inch in thickness. . . In spite of its smallness, it retains all of the practical characteristics of the famous Levolier line. It is the smallest 6 amp. switch made.

At the left are shown six logical uses for this practical Levolier, which may be secured in three different stem lengths.

You'll make no mistake in ordering these Levolier Thin Model Switches

Levolier
Pull Sockets
Pull Hooks
Conduit Box
Fixture, Lever, Pull and In-Surface Switches
Hickeys

McGILL MANUFACTURING CO.
Electrical Specialties of Quality
ESTABLISHED 1904
VALPARAISO · INDIANA
Box No. 670

Lamp Guards
Lamp Coloring and Frosting
Soldering Flux
Blow Torches
Lamp Changers

A STRONG SMOOTH WELD

Fretz-Moon Conduit is welded to last. The exclusive process and accurate control under which it is made produces rigid conduit second to none—conduit that will resist rough handling and severe service.

To make doubly sure that every length is without blemish, however, it is given severe tests . . . and the average of tests shows that the Fretz-Moon product will expand about 75 per cent more than ordinary conduit before failure.

Fretz-Moon Conduit is available in three finishes—ENAMELITE, black enameled; ELECTRO GALVITE, electro galvanized; HOT DIPPED GALVITE, hot galvanized—the best rigid conduit that money can buy.

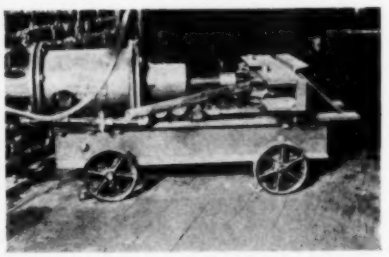
FRETZ-MOON TUBE CO., Inc. • Butler, Penna.

FRETZ-MOON
RIGID CONDUIT

PRACTICAL METHODS

AIR-BRAKE PIPE BENDER

C. L. Lewis of the C. L. Electric Co., Pocatello, Idaho, has made a pipe bender that has all kinds of power, and yet can be controlled to a nicety. As shown in the illustration, the basis of this is a Westing-



house air-brake cylinder, mounted on a low truck and fed by a compressed air line in the shop. The powerful ram forces the bending shoe against the pipe midway between two other shoes mounted on the pins shown in the transverse frame. Holes in this transverse frame permit these stationary shoes to be moved farther apart for large bends or closer together for sharper bends. The cylinder was obtained from an old freight car.

DUST PROOF TRANSFORMER WORK ROOM: To do satisfactory work on high voltage transformers it is necessary to have as nearly as possible a perfectly clean dust-proof work-room, as dust particles can do serious damage in an open transformer. With this in mind the Electric Power & Construction Co., Akron, Ohio, have made a canvas drop to protect their transformer work-room. This is fitted with isinglass windows to permit a maximum of light.

For all its power, the ram can be "inched" along by applying the air momentarily as the motorman applies his air brakes when he wishes to ease his car along. The pressure can almost be made a series of short blows and a very good bend can be obtained.

While primarily a shop tool, on large work where compressed air is available it can be used on the job. It is adapted to 1 in. to 2 in. pipe.

LOOSE CANOPIES MADE SOLID AGAIN

A certain restaurant in Tacoma, Wash., had a number of rather low wall fixtures, and the waiters were always knocking against them and loosening the canopies from the bases.

Canopy Being Packed with Asbestos Sleeving

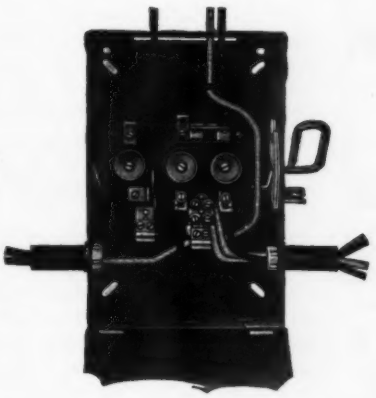
Robert Gleason, electrical contractor, was called in to remedy the trouble, and he and his electrician hit upon an original idea for making the canopies even more solid than they originally were.

The fixtures were brought in to the shop and a length of asbestos sleeving about 5 ft. long was coiled around the base of the socket between it and the canopy and packed in solidly with a screw-driver with each turn. This took but a few minutes to each one, but when the job was done the canopy was as solid over the socket as ever, and the asbestos packing not only mechanically did the trick but was safe from an electrical standpoint.

MURRAY
SAFETY SWITCHES

SEALED FUSE METER SWITCHES
(New Cutout—With Dual Switch Contacts)

WITH BRANCH CIRCUIT FUSES
IN THE SAME CABINET



IS
The Wiring
EASY?
Here's No. 1335

30 AMP. 125 VOLTS, 2 POLE 1 PLUG FUSE SERVICE, NEUTRAL SOLID AND 2—2 WIRE BRANCHES—2 PLUG FUSES.

RIGHT—
EXTERIOR OF NO. 1335 SHOWING BRANCH CIRCUIT FUSES ARE ONLY ACCESSIBLE WHEN SWITCH IS IN "OFF" POSITION. FROM "ON" TO "OFF" POSITION IS ONE OPERATION — AUXILIARY DOOR OPENS AUTOMATICALLY.

OTHER TYPES AVAILABLE
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METROPOLITAN
DEVICE CORPORATION
1250 ATLANTIC AVENUE
BROOKLYN · NEW YORK

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1. 2.

HANGERS FOR CABLES & CONDUITS

Easily the best for quick, low-cost installation work. Send for full details and costs.

1 Hanger without Porcelain Bushing. Spring steel; stronger, quicker, more compactly arranged.

2 Hanger attached to steel beam with bolt and nut.

3 Jiffy Clip—quicker, neater work at less cost.

4 Cable Joint or Pothead Compound—8 grades for every system, underground or overhead.

3.

JIFFY CLIPS

4.

Insulating Compounds

MINERALLAC ELECTRIC CO.
25 North Peoria Street, Chicago, Ill.

NEW—EASY WAY TO MAKE EXTRA MONEY —RIGHT ALONG

Selling Chromalox Replacement Range Units made $210.36 in 4 weeks for this Reading, Mass. dealer.

GO AFTER REPLACEMENT RANGE UNIT BUSINESS with Chromalox Units. Clapp & Leach sold 54 units in 4 weeks. Altoona, Pa. dealer made $136.50 in 2 months. Richmond, Va. contractor sold 48 units in 4 months, made $187.20 profit. Chromalox replacement units are a money-making, depression-proof item. Range owners want to buy them. Easy to install, sizes to fit every make of range, old or new. Write for sure-fire sales plan already in use by dealers Liberal discounts; free sales helps, etc. No obligation.

MAIL WITH YOUR BUSINESS LETTERHEAD TODAY!

E. L. Wiegand Co., 7585 Thomas Blvd., Pittsburgh, Pa. Without obligation, send us complete data about Chromalox Super-Speed Replacement Range Units and how we can make money selling them. There are approx. ..... elec. ranges in the territory we serve. Check which ( ) We sell elec. ranges ( ) We do not sell elec. ranges. ( ) Send us catalogs about Chromalox-equipped electric ranges.

Signed ..... Position .....

RED SEAL CONCLUSIONS

(Continued from page 17)

3. That even under the worst of depression conditions, it is possible to keep almost to 100 per cent in the ratio of Red Seal houses to building.
4. That a minimum wiring standard, kept to a very simple form, can be "sold" for keeps, whereas the time, labor and general difficulty of putting over a highly specialized, complicated standard hardly pays for itself, so far as the general run of builders, and public, are concerned.

In explanation of these conclusions, it may be stated that exhaustive check-ups, repeated several years, indicate that in the 17,500 Red Seal homes in Toronto, there are $12,000,000 worth of electric equipment—including fixtures, lamps, ranges, refrigerators, and appliances in general. Contrasted with this, it has been shown from repeated exhaustive tests, that 17,500 non-Red Seal homes built in the same period, of the same general class, have but $5,000,000 worth of electric equipment.

In proof of conclusion No. 2, it can be stated that so far in 1932, with house building volume only 20 per cent of what it was last year, Red Seal houses are 60 per cent—and last year was a peak year in volume for Red Seal houses. A large number of older houses have been re-wired to Red Seal standard. The ratio of total Red Seal houses to building in 1932 runs almost 100 per cent, with the aid of the older houses put on the Red Seal list.

When selling houses is difficult, builders need Red Seal advertising and certification more than ever, and it is not difficult to keep them up to standard, if it be reasonable.

The explanation of No. 4 conclusion should be obvious. To sell the public, the industry must put its case in such a way, simply, concretely, and reasonably, that it can be easily understood by the layman. Red Seal, properly arranged, is just this. Housing and house-wiring are general public affairs—and the selling of adequate wiring must meet that fact. That is why the Red Seal system is worth more than all elaborate, technical standards—no matter how good—combined. It is the application and the result that count, not the formula.

G. W. Austen, Manager
Electric Service League of Toronto.

SHERMAN SET SCREW CONNECTORS

AN OLD TYPE
WITH IMPROVED FEATURES
SCREWS HEAVILY RUST-PROOFED

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BATTLE CREEK ▾▾ MICHIGAN

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NEWS MANUFACTURERS

A DEPARTMENT FOR THE ANNOUNCEMENT OF ACTIVITIES OF MANUFACTURERS THAT ARE OF INTEREST TO CONTRACTORS, SUCH AS CHANGES IN EXECUTIVE PERSONNEL, BRANCH OFFICES, NEW PRODUCTS, ETC.

RATTAN TO CONFINE EFFORTS TO ELECTRICAL FITTINGS

The Rattan Manufacturing Co., New Haven, Conn., established in 1857, manufacturing electrical equipment, has given up all lines and will confine its manufacturing efforts in the future to electrical fittings.

The company has demolished all of its factory buildings except the one most recently built, which has been completely remodeled and is now operated by motor driven machinery.

Complete lines are being offered on squeeze, set screw, straight, angle and duplex connectors; bushings; locknuts; pipe straps; nipples; entrance ells and caps; ground clamps; utility outlets; bonding locknuts; thin wall conduit fittings; knockout-closers; connectors for non-metallic sheathed cable; angle adapters; conduit couplings; fixture studs; conduit benders; fish wire; outlet, gang and concrete boxes and covers; Marr connectors and portable garage lights.

Hatheway & Company, recently moved from 225 Varick Street to 220 Church Street, New York City, will continue to represent the company as general sales agents.

CHANGES IN GRAYBAR WEST COAST PERSONNEL

J. J. Colwell, manager of the Seattle, Wash., branch of the Graybar Electric Co., New York City, has been appointed northwestern district manager for Graybar. Mr. Colwell has been associated with the company since 1904 and has been manager of the Seattle branch since 1913.

J. P. Carson has been appointed sales manager of the Los Angeles branch. Mr. Carson was formerly manager of the office in Spokane, Wash. He will be replaced in Spokane by V. E. McCain of Tacoma, and J. Reine of Seattle will be located in Tacoma to take Mr. McCain's place.

LARGER N. Y. QUARTERS FOR HYGRADE SYLVANIA

The entire fiftieth floor of the building at 500 Fifth Avenue, New York City, has been leased by the Hygrade Sylvania Corporation, Salem, Mass.

The main lamp sales offices will remain at Salem, Mass., and the main tube sales offices at Emporium, Penna., as heretofore.

Circle F Mfg. Co., Trenton, N. J., has just published its Catalog No. 11, covering Bakelite and brass shell sockets; switches and receptacles; porcelain sockets and receptacles; miscellaneous receptacles and Bakelite devices. The catalog is illustrated and also contains price-lists.

The Paine Co., 2951 Carroll Ave., Chicago, has published a pamphlet descriptive of its lead anchors for attaching any object to concrete, brick, tile, slate, marble, stone, etc.

Knox Porcelain Corporation, Knoxville, Tenn., has recently published a 4-page pamphlet describing the Knox Neon sign insulators, electrode bushings, electrode housings, cable and tube supports.

General Electric Co., Schenectady, N. Y., has just published bulletin GEA-1661, covering metal-clad switchgear, type MI-6.

A

TIME SWITCH BUILT to LAST

EVERY detail of the T-13 has been engineered toward a common end: To produce a time switch that you can rely upon to perform your customer's job year after year without trouble, maintenance, and inspection. That is why the Telechron motor was chosen as the timing element. That is why the mercury-to-mercury contact Kon-nec-tor—which never wears out in service—was chosen as the switch. The T-13 is the ideal general-purpose time switch because it is accurate, reliable, simple, economical, and widely adaptable—yet, with all this, moderately priced.

521-29

GENERAL ELECTRIC

MAIL THE COUPON FOR COMPLETE INFORMATION AND PRICES

Address: General Electric Co., Schenectady, N. Y., Room 307, Bldg. No. 6.

Name.....

Address.....

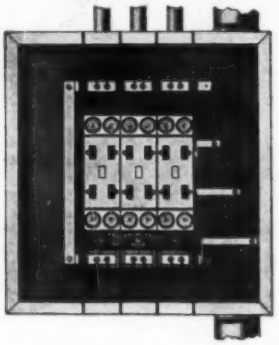
Firm.....EC

UMI

January New Products

1. Panelboard

A new type of panelboard known as the Hixley panel has been developed by the Trumbull Electric Mfg. Co., Plainville, Conn. The Hixley panelboard



has a compartment type cabinet, and does away with wrapping conductors with fireproof tape. It presents an orderly arrangement of circuits built on the protective bulk head compartment design by which damage to any branch circuit wiring is confined to a single compartment.

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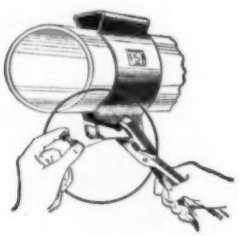
2. Conduit and Cable Clamp

An improved conduit and cable clamp provided with a slot into which the bolt with nut attached slips into place has



been developed by the Paine Company, Chicago. A bolt the right length is supplied with clamp, eliminating the necessity of cutting off the end, and a few turns of the bolt and the clamp is tight. It can be supplied in sizes from ⅜ to 2½ in.

---

3. Combination Main Switch

A line of combination main switch, lighting and range fuse combinations is announced by Square D Co., Detroit, Mich. Catalog No. 34352 illustrated above contains a quick-make and break disc switch, main fuse, four 30-amp.

lighting fuses and a 60-amp. range circuit fuse. Range and main fuse sections are equipped with Square D fuse-break, making cabinet dead front. Fuses are carried on a cover which automatically disconnect them from current when removed. Contact jaws are recessed below surface of chamber. Main switch may be mounted either at top or bottom. All devices in this line are equipped with extra lugs after main fuses for "tapping off" existing circuits.

---

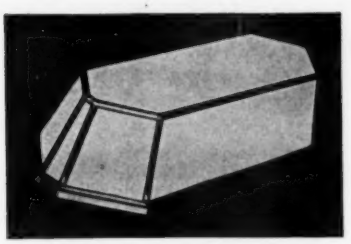
4. Motor Driven Air Heater

Edwin L. Wiegand Co., Pittsburgh, Pa., announces the Chromalox electric Heetflo, a motor-driven air heating unit, rated at 1000 watts, 115 volts. Unit is

5½ in. high, 9 in. diameter and weighs 5½ lbs. It has a shade pole type motor, with oilless bearings, chromalox enclosed type heating element, and has a durable case in art-style, bronze finish with 6 ft. heater cord. Manufacturers claim it will give an even flow of heat directly to the floor, and is silent in operation. It has no exposed wires, and is built to fit under any low-built furniture so as to be placed out of sight.

5. Built-in Lighting

The F. W. Wakefield Brass Co., Vermillion, Ohio, announces the Wakefield "Dominos" which are complete fixtures applied to wall or ceiling surface, and employed in combinations or "sets" of three or more units arranged in deco-

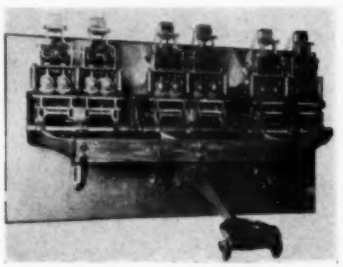


rative pattern to secure built-in lighting effect and adaptable to any structural conditions without remodeling of walls or ceilings. Individual unit consists of a plate with supports, 30½ by 11 in. overall and pointed at both ends. On plate are mounted two duplex sockets which accommodate lamps of from 15 to 100-watt sizes. Supported from plate is a hinged and removable frame, 6¼ in. deep, which carries a globe built up of 9 pieces of flashed opal.

---

6. Air Circuit Breaker

General Electric Co., Schenectady, N. Y., announces a line of manually and electrically operated air circuit breakers designated as AL-2, rated up to 750 volts, 10,000 amp., and made in single,



double, triple and 4-pole arrangements. Multi-pole breakers consist of two or more self-contained, single-pole units mechanically interconnected for group operation. Breakers are trip-free. Overcurrent mechanism is constructed for direct tripping action on breakers of all ratings. Main contacts are silver-to-silver, self-aligning, with heavy, solid, stationary contacts and a solid movable member. Contacts are adjustable. Intermediate and arcing contacts protect main contacts.

For further information on any product Use Coupon on Page 45

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Bulletin
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STANDARD TRANSFORMER CO.
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Only insulated wire connector with brass binding screw contact.
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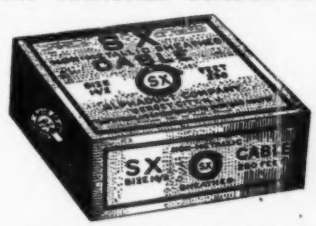
NON-METALLIC FLEXIBLE CONDUIT
"MEASURE MARKED"
"SX" NON-METALLIC SHEATHED CABLE
METALLIC FLEXIBLE CONDUIT
"AX" ARMORED CONDUCTOR



STOCKED BY LEADING JOBBERS

GEORGE P. BALDWIN

George P. Baldwin, vice-president of the General Electric Company, in charge of activities connected with steam railroad electrification, died of pneumonia, December 7, in New York City.

Mr. Baldwin was born in San Francisco in 1874 and was graduated from Leland Stanford University in 1896. In the following year he entered the employ of the Stanley Electric Company, which in 1903 was bought by the General Electric Company. At that time Mr. Baldwin became vice-president of the Blaisdell Company of Los Angeles until 1910, when he was made manager of the Pittsburgh office of the General Electric Co. In 1925 he became a vice-president of the company with headquarters in New York City.

O. Z. Cable Support Co. Inc., Brooklyn, N. Y. announces its catalog No. 3, covering conduit type cable supports, insulated bushings, end fittings, insulated covers, parallel gutter taps, solderless lugs, two-way connectors and T-cable taps. In addition to illustrations of these items, the catalog contains photographs showing the use of these fittings in actual installations. Price-lists and data sheets are also included in this catalog.

Bulletin GEA-1191A, superseding GEA-1191, descriptive of synchronous motors, containing illustrations, charts showing rated horse-powers and general description of the various types of motors, has been published by General Electric Co., Schenectady, N. Y.

for
60 Years
the name
YAGER'S
has meant the best available quality of
Soldering Salts
and
Soldering Paste
Write for
FREE
Sample
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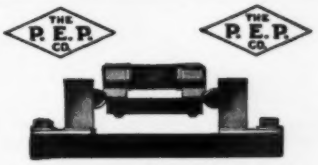
Hudson, N. Y.



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THE PLAINVILLE ELECTRICAL PRODUCTS CO.
PLAINVILLE, CONN.
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ELECTRICAL CONTRACTING
520 North Michigan Avenue
Chicago, Ill.

Please send us without obligation further information on the following new products described in your January issue: (check)

1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐

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Street and Number.....City.....State.....

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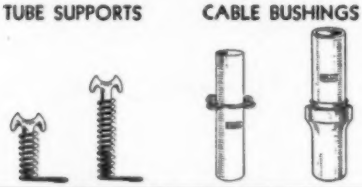
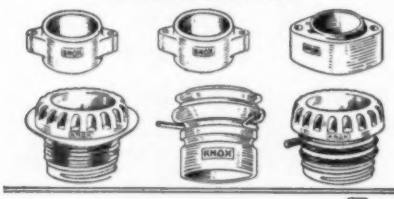
INSULATORS

KNOX NEON insulators are manufactured from the same genuine Imported English Clays as the well known line of KNOX extreme high voltage Insulators. You are thus assured of unquestionable quality.

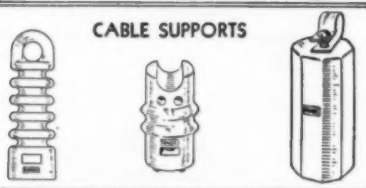
TUBE SUPPORTS CABLE BUSHINGS



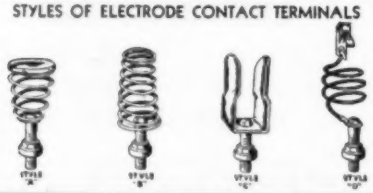
ELECTRODE BUSHINGS



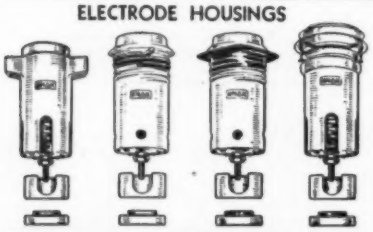
CABLE SUPPORTS



STYLES OF ELECTRODE CONTACT TERMINALS



ELECTRODE HOUSINGS



Write for complete CATALOG and NET price sheet of the KNOX line of NEON insulators, High Voltage Tubes, Porcelain BUSHINGS, all types Incandescent Sign Receptacles, etc.

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in 1933

Push these Opportunities for Winter Floodlighting Applications

WINTER SPORTS. In the northern states, winter sports offer a profitable field for the installation of floodlighting. The days are short, and the recreational facilities must be lighted at night in order to give all those who desire, an opportunity to use them. Furthermore, it is at night that the ice and snow are in best condition.

The skating ponds, toboggan slides, and hockey rinks in your municipal playgrounds and parks, schools, and clubs offer opportunities for profitable business. In many cases it will be possible to sell a larger installation by showing how the lights can be used also for summer sports.

FLOODLIGHTING FOR PROTECTION. Industrial buildings and grounds, parking areas, storage yards, coal yards, lumber yards, and dark areas around commercial buildings must be guarded at night from mischief-makers and thieves. During the winter especially, the long nights make the need for additional protection imperative. A systematic study of your local police records will help you to make the most of this profitable field.

Residences, driveways, and garages also need light for protection. G-E Handy floodlights will serve for most of these applications.

YEAR-AROUND POSSIBILITIES FOR FLOODLIGHTING

Buildings • Factories and Industrial Areas • Construction Work • Parking Areas • Filling Stations • Outdoor Sports, Winter and Summer • Playgrounds • Swimming Pools and Beaches • Residences, Grounds, and Gardens • Fairs, Pageants, and Race Tracks • Signs, Billboards, and Advertising Displays • Farm Buildings and Yards, Roadside Stands • Natural Scenery in Parks and Estates.

General Electric floodlighting engineers will gladly help you plan any unusual or complicated applications or answer questions which may arise in the course of any installation. Write to your nearest G-E Office or General Electric, Schenectady, N. Y.

710-167

GENERAL ELECTRIC

Twilight Zone* Tests
—bring you *new business*

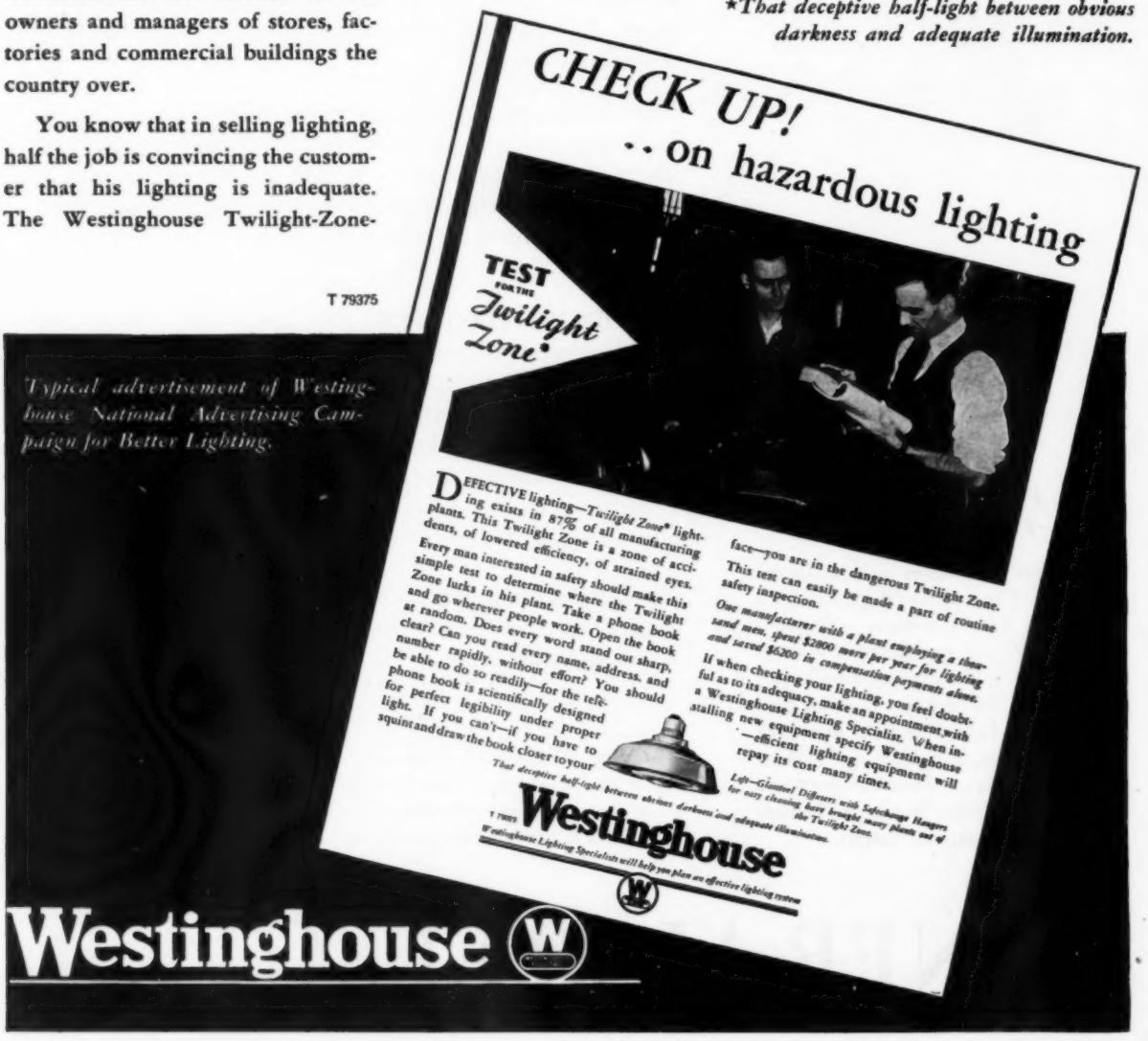
FOR YOU, an electrical contractor, the Twilight Zone* is a zone of sales opportunities—a fertile field for new installations and profitable rewiring contracts.

This field is now being opened up by the National Building Rehabilitation Program and the Westinghouse nation-wide advertising campaign for better lighting. "Test for Twilight Zone," the theme of this campaign is being forcefully presented by advertisements of which the one shown below is typical. These advertisements are directed to the owners and managers of stores, factories and commercial buildings the country over.

You know that in selling lighting, half the job is convincing the customer that his lighting is inadequate. The Westinghouse Twilight-Zone-Test advertisements are doing this for you. They are causing industrial executives and building managers to question the adequacy of their lighting—to go into their shops and buildings to test for Twilight Zones.

Go with them to make the phone book test, and to point out to them the dangerous and expensive Twilight Zones. And when installing new lighting, you can guarantee your work and build a good reputation by using Westinghouse equipment.

**That deceptive half-light between obvious darkness and adequate illumination.*


CHECK UP!
.. on hazardous lighting
TEST FOR THE Twilight Zone*
DEFECTIVE lighting—Twilight Zone* lighting exists in 87% of all manufacturing plants. This Twilight Zone is a zone of accidents, of lowered efficiency, of strained eyes.
Every man interested in safety should make this simple test to determine where the Twilight Zone lurks in his plant. Take a phone book and go wherever people work. Open the book at random. Does every word stand out sharp, clear? Can you read every name, address, and number rapidly, without effort? You should be able to do so readily—for the telephone book is scientifically designed for perfect legibility under proper light. If you can't—if you have to squint and draw the book closer to your face—you are in the dangerous Twilight Zone. This test can easily be made a part of routine safety inspection.
One manufacturer with a plant employing a thousand men, spent $2800 more per year for lighting and saved $6200 in compensation payments alone.
If when checking your lighting, you feel doubtful as to its adequacy, make an appointment with a Westinghouse Lighting Specialist. When installing new equipment specify Westinghouse —efficient lighting equipment will repay its cost many times.
That deceptive half-light between obvious darkness and adequate illumination.
Left—Glasteel Diffusers, with Safeclean Hangers for easy cleaning, have brought many plants out of the Twilight Zone.
T 79375
Westinghouse
Westinghouse Lighting Specialists will help you plan an effective lighting system
T 79375
Westinghouse

Typical advertisement of Westinghouse National Advertising Campaign for Better Lighting.

THEY ALL HAVE TURNED TO PANTHER *and* DRAGON

IT was just a year ago that we introduced these two new commercial tapes as the outstanding value in their class. Time has proved the soundness of our prophecy for popularity.

Manufactured by the true friction process we knew we could not say enough for the adhesiveness and tensile strength of Panther and Dragon Tapes. As new members of the Okonite and Manson family they were backed by the Okonite, Okonite-Callender and Hazard reputation for quality. And there is quality not only in the tapes themselves but in the appearance of their packing and the method by which their qualities are preserved.

Attractively packed, wound on individual green cores, *cellophane wrapped and sealed* and extensively advertised, they are tapes which are not only more handy and efficient for the contractor but more salable to the consumer. They're the tapes you'd choose to use yourself as well as sell.

HAZARD INSULATED WIRE WORKS

Division of

THE OKONITE COMPANY

Factory: Passaic, N. J.

Sales Offices: NEW YORK . CHICAGO . PHILADELPHIA . PITTSBURGH . ST. LOUIS
BOSTON . ATLANTA . SAN FRANCISCO . LOS ANGELES . DALLAS . SEATTLE

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made by GENERAL ELECTRIC
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